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HARVARD SCHOOL OF PUBLIC HEALTH

Courses of Instruction

1963–1964

OFFICIAL REGISTER OF HARVARD UNIVERSITY

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1963-64

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Section I
Introductory Information

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1963–64

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Office, Building A, Harvard Medical School, 25 Shattuck Street, Boston.

Director, Health and Medical Care Program for Students: DONALD ASA TUCKER, M.D.
Office, Peter Bent Brigham Hospital, 721 Huntington Avenue, Boston.

The Offices of Administration of the School of Public Health are located at 55 Shattuck Street, Boston.

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* For details of title, see listing under the Department.

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Melvin William First, S.B., S.M., S.D., *Industrial Hygiene.*

Herbert Leonard Ley, Jr., M.D., M.P.H., *Epidemiology and Microbiology.*

Mary Ochsenhirt Amdur, S.B., PH.D., *Physiology.*

Leon Sternfeld, S.B., M.D., PH.D., M.P.H., *Maternal and Child Health.*

Marjorie Anne Christina Young, S.B., ED.M., M.P.H., DR.P.H., *Public Health Practice.*

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Thomas Feger Pugh, M.D., M.P.H., *Epidemiology.*

Lecturers

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Assistant Professors

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Stanley Norton Gershoff, A.B., S.M., PH.D., *Nutrition.*
Oscar William Portman, S.B., M.D., *Nutrition.*
Joseph John Vitale, S.B., S.M., S.D. IN HYG., *Nutrition.*
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Howard Webster Stoudt, Jr., a.b., a.m., ph.d., s.m. in hyg., *Physiology.*

The names of the members of the teaching and research staff are listed in their respective departments under Content of the Courses, pages 37–87.

INTRODUCTION

The Harvard School of Public Health is one of the six privately endowed institutions in the United States which are primarily devoted to graduate education in public health. The School operates as an independent unit of Harvard University in close association with the Faculty of Arts and Sciences; the Graduate Schools of Education, Public Administration and Business Administration; the Medical School; the School of Dental Medicine; and the various Harvard hospitals. This introduction indicates in a general way the opportunities the School affords those students who are seeking a career in one or more of the three principal areas of public health activities: teaching, research, and administration.

Public health evolved from the early combination of medical science and engineering for the control of environmental hazards. Public health has grown to embrace various facets of the biological, physical and social sciences as the community aspects of health problems have become more complex. In its plans for the future, the Harvard School of Public Health is principally concerned with two general kinds of problems. In the first category are the problems which have emerged as certain areas of the world have become highly urbanized and technologically advanced. Foremost among these problems are mental illness, cancer and the degenerative diseases, accidents, and the hazards of ionizing radiations. Discovery of causes and factors which modify the course of illness and injury is necessary for the development of prevention and control. Research is also needed to achieve effective administrative technics for the provision of optimum health services for entire communities.

The other general category of problems in public health derives from the fact that more than half of the people in the world reside in areas seriously afflicted by malnutrition and communicable diseases. The programs which have been successful in the technologically advanced countries often cannot be used because of basic differences in culture, geography or economic factors.

In its approach to these problems the Harvard School of Public

Health has as its objective the advancement of public health, both nationally and internationally. The School seeks to accomplish its objective through its activities in education and by its search for knowledge. The Faculty is equally committed to basic research in new fields and to the development of effective methods for the application of knowledge by communities or nations. The Faculty of the School and its alumni have the opportunity to play a role of major importance in the decades ahead as the profession of public health deals with the health problems of our rapidly changing societies.

The primary intent of the curriculum in the Harvard School of Public Health is to attract individuals who have the potentiality for original contributions to public health. In the selection of applicants preference will be given by the Admissions Committee to students who are capable of undertaking a course of study leading to a doctoral degree in one of the departments or disciplines of the School.

FACILITIES

Most departments of the School of Public Health are housed in four buildings: the Rotch Building at 55 Shattuck Street, the Huntington Building at 1 Shattuck Street, and two research buildings at 665 Huntington Avenue, Boston (15). The administrative offices are in the Rotch Building. The School's buildings are adjacent to the Harvard Medical and Dental Schools, the Children's Medical Center, the Peter Bent Brigham Hospital, and the Boston Lying-In Hospital.

The facilities of the hospitals and the adjacent institutions are available to qualified students of this School, and are used in connection with the teaching of various subjects. In addition, students enrolled at the School may take courses in other departments of Harvard University, such as in the social sciences, public administration, and medical sciences. Certain graduate courses at the Massachusetts Institute of Technology are also open to students of this School.

The Department of Sanitary Engineering of the School is also part of the Division of Engineering and Applied Physics of the Harvard Graduate School of Arts and Sciences. The basic course in Water and Food Sanitation for students of the School of Public

Health is taught here, but properly qualified students may also register for courses in Sanitary Engineering given in Cambridge.

The School maintains a close association with a wide variety of health, medical care, and welfare organizations in Massachusetts and elsewhere. These include health departments, hospital and other medical facilities, private health and welfare agencies, and community planning groups. These organizations provide opportunities for observation and special studies, and members of their staffs are available to assist in the School's educational program. Administrative methods at local levels may be studied at first hand in some of these agencies in the Greater Boston Area.

The Institute of Laboratories of the Massachusetts Department of Public Health is engaged in a program of general interest, attracting visitors and students from various parts of the United States and from foreign countries. It not only performs a wide variety of standard bacteriological, immunological and chemical procedures, but is actively engaged in several research programs. Its Superintendent is a member of the School's Faculty. This close contact with one of the country's outstanding laboratories provides unsurpassed opportunities for qualified students who wish to obtain intensive experience in many types of laboratory methods of particular pertinence to public health.

The clinical and laboratory facilities of the Lemuel Shattuck Hospital are available to students of the School. This hospital was built by the Department of Public Health of the Commonwealth of Massachusetts for the treatment and rehabilitation of patients with chronic diseases. Since the average duration of hospitalization is usually longer than that in general hospitals, an opportunity is afforded to study chronic disease problems not encountered in general hospitals. The training program, consultant rounds and professional staff appointments are under the aegis of the Deans of Boston University, Harvard and Tufts University Medical Schools, as well as the Harvard School of Public Health. Research laboratories at the Shattuck Hospital are engaged in studies of arthritis, hematology, pulmonary function, radioisotopes, cancer therapy and chronic renal and hepatic diseases.

Libraries

The joint Library of the School of Public Health and the Harvard Medical School is on the second floor of the Administration Building of the Medical School. It is open from 9 a.m. until 10 p.m. on week days, from 9 a.m. until 5 p.m. on Saturdays, and from 2 p.m. until 6 p.m. on Sundays. There are at present 300,000 catalogued volumes and pamphlets, and 1,900 periodicals are received currently.

Students also have the privilege of using the College Library in Cambridge, as well as the various departmental libraries belonging to the University, in all of which there are more than 4,000,000 volumes and pamphlets.

The Boston Medical Library, No. 8 The Fenway, contains about 225,000 bound volumes and 160,000 pamphlets, and receives 1,500 current periodicals. This valuable library is open on week days from 9 a.m. to 5 p.m., Saturdays 9 a.m. to 1 p.m., and on Mondays and Thursdays until 9 p.m., Oct. 1 through May 31.

Students of the School also have access to the Boston Public Library.

EXTRACURRICULAR EVENTS

A significant part of the opportunity for the exchange of knowledge in the health fields is the extracurricular activity which takes place under student or faculty sponsorship. Throughout the year there are informal interchanges of ideas among members of the student body and their families, particularly in the social and recreational areas of the Henry Lee Shattuck International House. In addition there are discussions on topics of international interest including presentations by students on the culture, geography, and social structure of their home countries. The Henry Lee Shattuck International House has equipment for showing films and colored slides which facilitates the scheduling of such occasions. At the School there are showings of films followed by discussion periods for clarification of the material or consideration of its uses.

Section II

Admission Requirements
Courses of Study and Degrees

ADMISSION REQUIREMENTS

Application for Admission

Applicants for admission to the School must submit the following material for consideration by the Committee on Admissions and Degrees: (1) completed application form; (2) transcripts of academic record at college, graduate school and/or professional school; (3) names of at least three people, well acquainted with the applicant's previous work, from whom the School may request letters of reference.

Applicants from countries in which the language of instruction is not English must satisfy the Committee on Admissions and Degrees as to their ability to speak, read, write and understand the English language competently. In order to profit from a program of graduate study, the applicant must have sufficient knowledge of English to enable him to understand lectures in English, to participate in seminar discussions and to write examinations. In the absence of sufficient evidence from the sponsoring agency and other sources, the School may request that the applicant take and pass satisfactorily the University of Michigan English Language Test. If, upon arrival at the School, a student's command of English is found to be inadequate, he may be required to take further instruction in English.

In addition to fulfilling the specific requirements for admission to the several degree programs, applicants must satisfy the Committee as to their scholastic ability and potentiality for profitable study at a graduate level. In all instances, the final judgment as to the admissibility of an applicant rests with the Committee on Admissions and Degrees.

Preference will be given to applicants under 40 years of age; applicants over 45 years of age may be considered for admission only under exceptional circumstances.

The School is unable to accept all who apply and are eligible for admission. Therefore, persons who wish to be considered for ad-

mission to the 1964–65 Class are urged to submit their applications by April 1, 1964. However, applications which are completed *by July 31, 1964*, will be considered, subject to availability of space.

Admission of a candidate for one academic year does not automatically admit him in a subsequent year; re-application must be considered on the candidate's own merits in the light of the particular circumstances which govern the decisions of the Committee on Admissions and Degrees.

All inquiries and communications regarding admission should be addressed to The Registrar, Harvard School of Public Health, 55 Shattuck Street, Boston 15, Massachusetts.

Living Expenses

Experience has shown that it is difficult for a student to get the most out of his year at the School if he has to be unduly concerned about funds to meet his expenses. Living costs in the Boston area are usually found to be higher than in most areas from which students come. Therefore, the School has adopted the policy stated below in regard to applicants for admission from outside the United States.

An applicant whose financial support is not guaranteed by an official U. S. agency or foundation must submit evidence satisfactory to the School that he will have sufficient funds available in U. S. currency to enable him to pay his expenses during the academic year. The minimum amount needed by a single person, in addition to travel, is $3,800, to cover the cost of tuition ($1,520) and living expenses of at least $250 a month for nine months. If an applicant plans to bring his family, he must have at least $900 more for his wife and $450 for each dependent child, in addition to travel expense. Certification of adequate financial resources must be received by the School before the immigration form needed to obtain a visa to enter the U.S. can be issued to the student.

COURSES OF STUDY AND DEGREES

Master of Public Health Degree

Requirements for Admission

1. Applicants may be considered for admission as candidates for the Master of Public Health degree if they are graduates of approved schools of medicine or if they have similarly thorough preparation in the biological sciences.

2. Persons with these qualifications must satisfy the Committee on Admissions and Degrees as to their scholastic abilities and potentiality for profitable study at a graduate level. In arriving at its decision, the Committee will give consideration to practical experience when relevant.

Requirements for the Degree

1. One academic year must be spent in residence at the University. The student must complete successfully the required and elective courses to a minimum total of 40 credit units. The basic curriculum for the Master of Public Health degree includes courses in ten areas. All candidates for the degree are required to take the following four courses, unless they can demonstrate equivalent preparation:

Course	*Credit units*
Biostatistics 1a,b	3.5
Epidemiology 1a,b	2.5
Public Health Practice 1a,b	3
Environmental Health 1d	2.5

2. In addition they must elect a minimum of 12.5 credit units in the remaining six courses of the basic curriculum, as follows:

	Credit units
Ecology and Epidemiology of Infectious Diseases (Microbiology and Tropical Public Health 1a,b,c)	6
Epidemiology of Non-Infectious Disease (Epidemiology 2c,d)	3
Man's Responses to the Physical Environment (Environmental Health 1c)	2.5

The Human Community (Interdepartmental Course 1a)	2.5
Principles of Maternal and Child Health (Maternal and Child Health 1b)	2
Public Health Nutrition (Nutrition 1a,b)	2.5

3. The remainder of the time will be devoted to departmental or divisional courses, seminars and tutorial work. These courses are described on pages 37–87. Courses offered by other Faculties of the University are also available.

4. No formal classes are scheduled during the one-week period from January 27 to February 1, 1964. This time is to be used for supervised special studies or field observations. All candidates for the Master of Public Health degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

5. Upon completion of all course requirements the student must pass a comprehensive examination. This examination will be given only at the end of a term.

Master of Science in Hygiene Degree
(With Designation of a Field of Concentration)

This degree is granted on fulfillment of a program of advanced work in one of the basic disciplines of public health. The courses taken must form an integrated plan of study in one branch of knowledge and allied subjects.

Requirements for Admission

Applicants may be considered for admission as candidates for the Master of Science in Hygiene degree, on the basis of a one-year or a two-year program, if they meet the requirements in one of the categories listed below. They must also satisfy the Committee on Admissions and Degrees and the department within which they choose to specialize as to their potentiality for successful study at a graduate level within the School.

A. **One-year Program**

1. Applicants who are graduates of approved schools of medicine or who have similarly thorough preparation in the biological sciences.

2. Applicants who have a doctoral degree from an approved school in a discipline related to public health.

3. Applicants in public health specialties (social workers, nurses, health educators, nutritionists) who have obtained a master's degree with honor grades in their special fields and have had at least two years' acceptable experience in a public health activity.

4. Applicants in industrial hygiene or public health engineering who have a bachelor's degree with honor grades in physics, chemistry and engineering and who have a master's degree or equivalent graduate work with honor grades.

B. **Two-year Program**

1. Applicants with a bachelor's degree obtained with honors in the natural sciences who wish to specialize in one of the laboratory sciences or statistics.

2. Applicants with a bachelor's degree obtained with honors and with an adequate background in the natural sciences who wish to specialize in health education.

Under certain circumstances, a year of graduate work in another institution may be accepted as the first year of this program.

Requirements for the Degree

1. The student must spend a minimum of one year in residence at the University and must complete successfully a program of at least 40 credit units. Candidates in the two-year program must obtain at least 80 credit units.

2. All candidates for the degree are required to take Biostatistics and Epidemiology (Interdepartmental Course 2a,b,c,d) or, depending on their backgrounds, Biostatistics 1a,b and Epidemiology 1a,b, unless they can demonstrate equivalent preparation. The remainder of the program will be devoted to courses which may be prescribed by the department of concentration and to elective courses in the primary and related fields of interest. These courses are described on pages

37–87. Courses offered by other Faculties of the University are also available.

3. No formal classes are scheduled during the one-week period from January 27 to February 1, 1964. This time is to be used for supervised special studies or field observations. All candidates for the Master of Science in Hygiene degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

4. Upon completion of all course requirements the student must pass a comprehensive examination. This examination will be given only at the end of a term.

Master of Industrial Health

A program of courses leading to a Master of Industrial Health degree was established in 1949, in recognition of the need for post-graduate training in the public health disciplines which are relevant to the development of health and medical programs in industry.

Requirements for Admission

Candidates for this degree must be graduates of an acceptable school of medicine and must also satisfy the Committee on Admissions and Degrees as to their scholastic abilities and potentiality for profitable study at a graduate level. Students from the United States must have completed an internship of at least twelve months in a hospital approved by the American Medical Association.

Requirements for the Degree

1. One academic year must be spent in residence at the University.

2. The student must complete successfully the required and elective courses to a minimum total of 40 credit units. All candidates for the degree are expected to take the following courses unless they can demonstrate equivalent preparation:

Course	*Credit units*
Biostatistics 1a,b	3.5
Epidemiology 1a,b	2.5
Environmental Health 1d	2.5
Environmental Health 2a,b (Radiological Hygiene)	4
Environmental Health 7d (Occupational Medicine)	2
Industrial Hygiene 1c,d (Basic Problems in Occupational Health and Industrial Environments)	7
Industrial Hygiene 2a,b (Industrial Air Analysis)	4
Total	25.5

In addition, the student may select from the general curriculum courses of interest to him, or do special work subject to approval of the Heads of the Departments of Industrial Hygiene or Physiology.

3. No formal classes are scheduled during the one-week period from January 27 to February 1, 1964. This time is to be used for supervised special studies or field observations. All candidates for the Master of Industrial Health degree are required to register for work during this week, under Course 17e (Tutorial) or Course 30e (Field Study). See listings under the Departments for opportunities available. One unit of credit will be given for satisfactory completion of the week's assignment.

4. Upon completion of all course requirements the student must pass a comprehensive examination. This examination will be given only at the end of a term.

Doctor of Public Health

For the degree of Doctor of Public Health the student must complete an approved program of independent and original investigation in a special field and must present the results of this research in an acceptable thesis.

Requirements for Admission

1. An applicant for admission to candidacy for this degree must be either (a) a graduate of an approved school of medicine, dental

medicine or veterinary medicine, or (b) the holder of another doctoral degree in one of the basic sciences related to public health. In exceptional cases, an individual lacking a previous doctoral degree may be admitted if he has displayed outstanding ability in previous academic work and in practical public health experience.

2. The applicant must hold the degree of Master of Public Health or its equivalent from a recognized institution and must have demonstrated potential ability to undertake original investigation in a special field.

3. Admission to doctoral candidacy is considered provisional until the candidate has passed the oral qualifying examination.

Doctor of Science in Hygiene
(With Designation of a Field of Concentration)

This degree is granted on successful completion of a program of independent and original research in one of the basic disciplines of public health, and the presentation of this research in an acceptable thesis.

Requirements for Admission

Candidates for the degree of Doctor of Science in Hygiene must hold the degree of Master of Science in Hygiene or its equivalent and must indicate ability to undertake original investigation in a special field.

Admission to doctoral candidacy is considered provisional until the candidate has passed the oral qualifying examination.

Requirements for Doctoral Degrees

1. Residence

The student is required to complete a minimum of one academic year in residence. However, the required work and preparation of an acceptable thesis normally requires two full years and frequently longer.

2. Doctoral Program Advisor

After the student enrolls in the School as a provisional doctoral candidate, a Doctoral Program Advisor is appointed by the Department of concentration. This Advisor will keep the student informed of all procedures and requirements for the degree, will advise him about proper courses to be taken, will decide, together with the Department, when the student is prepared to take the qualifying examination, and will supervise the thesis work.

3. Foreign Language Requirement

The candidate must possess a reading knowledge of two languages, other than English, which will enable him to make use of the foreign literature pertinent to his professional interests, including his thesis subject. One of the languages must be French, German or Russian; the second may be another of these three languages or an additional one selected with the consent of the Department of concentration and the Committee on Admissions and Degrees. For a foreign student one of the languages may be his native tongue, subject to the approval of the Committee on Admissions and Degrees. One language examination must be passed before the candidate is permitted to take the qualifying examination. The second language examination must be passed before the appointment of the Readers of the Thesis. The candidate is urged to satisfy the language requirements as early as possible.

4. Qualifying Examination

When the Advisor and the Department judge that the candidate is prepared, an oral qualifying examination is conducted by Special Examiners, who examine in depth in the area of the candidate's general academic knowledge, his major interest, and related fields. This examination should be taken within six months, but no later than one year, after admission as a provisional doctoral candidate.

5. Evaluation of Candidate's Progress

After the candidate has passed the qualifying examination, two

Faculty members are appointed to aid the Advisor in the periodic evaluation of the student's progress.

6. Deadline Dates for Thesis

After the Advisor and Department deem the thesis completed, it shall be typed in final form. Three unbound copies must be deposited in the Dean's Office *before January first*, for degrees to be awarded at midyear, and *before April fifteenth* for degrees to be awarded in June. The thesis must be accompanied by 100 copies of a summary not exceeding 1200 words in length, which shall indicate clearly the purpose, methods, and results of the investigation.

7. Acceptance of the Thesis and Final Examination

When the thesis is submitted, three Readers will be appointed to determine if it is acceptable. If it is approved, a final examination will be given at which the student will defend his thesis before members of the Faculty, including the Readers. Ordinarily, the thesis must be approved within five years of the date of the qualifying examination.

A detailed statement of procedures and requirements for the doctoral program and for the preparation of the thesis may be obtained from the Registrar after the student has been admitted to provisional candidacy for the degree.

Special Students

Subject to availability of space, the School may accept a few students, on a full-time or a part-time basis, who are not degree candidates, but who are interested in taking one or more courses in a special field. Procedures and requirements for the admission of such students are the same as for degree candidates. Special students who later wish to be admitted to degree candidacy will be considered on the same basis as other applicants for admission. Admission as a special student carries with it no commitment to accept the applicant as a degree candidate.

Degrees in Engineering

Graduates of engineering colleges or scientific schools of recognized standing who are interested in the environmental engineering aspects of public health may be admitted to the Division of Engineering and Applied Physics of the Graduate School of Arts and Sciences as candidates for the degree of Master of Science, Master of Arts, Master of Engineering or Doctor of Philosophy. They may elect appropriate courses in the School of Public Health as a part of the program for these degrees.

For further information write to the Committee on Admissions, Graduate School of Arts and Sciences, Holyoke Center, 75 Mt. Auburn Street, Cambridge 38, Massachusetts.

Grading System

The grading system in effect at the School of Public Health is as follows: A and B are honor grades; C is acceptable; D is acceptable but of inferior quality; F is failing. Grade averages are computed on the basis of numerical equivalents, and according to the number of credit units in each course: A–1, B–2, C–3, D–5, F–8. The minimum level of performance acceptable for a Master of Public Health degree is C–(3.5) average. The minimum level of performance acceptable for a Master of Industrial Health or Master of Science in Hygiene is C (3.0) average. All graded courses are included in the average.

A student cannot qualify for a degree if he fails one or more required courses. However, if he fails only one required course, he may request a re-examination in that course. Re-examination will be given subject to approval of the instructor in the course and of the Committee on Admissions and Degrees, and will normally be given only after a period of additional study or course work, within a period of eight weeks following the initial failure.

A grade recorded as "Incomplete" will be changed to "F" if the course requirements are not satisfactorily fulfilled by the end of

the next period or before the comprehensive examination, whichever comes first.

A student must have at least 40 units of course credits to be eligible for the comprehensive examination. If the student fails the comprehensive examination he may request a re-examination. If the request is approved by the Committee on Admissions and Degrees, the re-examination may be taken within a period of one year.

The minimum level of performance acceptable for admission to doctoral degree candidacy is 2.5, based on at least one term's work.

Section III
Content of Courses

CONTENT OF COURSES

INTERDEPARTMENTAL COURSES

Interdepartmental Course 1a. The Human Community

Lectures and seminars. *Mondays and Fridays, 8:30–10:30, Wednesdays, 8:30–9:30, first period.* Dr. Reed, Dr. Levine and associates.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

Comprehension of health problems and implementation of health programs depend upon understanding the forms and forces active in community life. This course of instruction deals with demography, social and cultural characteristics of human populations, the organization and behavior of human communities, and their relationship to the environment. The objective of the course is to provide a knowledge of, and a set of concepts dealing with, human populations, interpersonal relationships, cultural values, and social organization, in preparation for the study of public health.

Interdepartmental Course 2a,b,c,d. Biostatistics and Epidemiology

Lectures, discussions and laboratory. *Tuesdays, 10:30–12:30, Saturdays, 9:30–11:30 in all four periods; Thursdays, 10:30–11:30, first, third and fourth periods; Thursdays, 11:30–12:30, second period.* Dr. Worcester, Dr. Bell and Dr. Hutchison.

Credit 7 units.

Required of Master of Science in Hygiene candidates (except those eligible to take Biostatistics 1a,b and Epidemiology 1a,b).

Epidemiology and biostatistics are two disciplines essential to the investigations of problems of health and disease at a community level. This course is an attempt to provide integrated teaching in these two subjects to a small group of students without medical background. Biostatistics, demography and epidemiology will be presented. There will be sessions devoted to the medical and biological sciences (e.g. immunology and genetics). A small number of diseases will be covered in detail to show the methods by which our present level of knowledge has been reached and to illustrate the principles of epidemiology. There will be laboratory exercises and demonstrations. Classic, as well as current, literature in epidemiology will be assigned.

Interdepartmental Course 3b. History and Philosophy of Public Health

Seminars. *Wednesdays, 3:30–5:30, second period.* Dr. MAYER and Visiting Lecturers.

Credit 1 unit.

The course has two major purposes: to help the student of Public Health gain a picture of the development of his profession, and to use selected historical situations to illustrate how scientific knowledge has interacted in the past with political structure, economic status and cultural attitudes in the determination of the health goals of various societies and the execution of programs. In this light, the development of the science and practice of medicine, sanitary engineering and demography in Ancient Egypt, Greece and Alexandria, Rome, the Arab and European Middle Ages and the Renaissance will be broadly sketched. The birth of the concept of a National Health Policy will be traced to the Ages of Mercantilism and Enlightenment. The Sanitary Movement and its relation to the Industrial Revolution will be examined with particular reference to Britain, France and the United States. Finally, an attempt will be made to evaluate the extent to which the lessons of history can be used in the formulation of health policies by emerging nations.

Interdepartmental Course 4c,d. Research Methods in Community Health

Lectures and discussions. *Tuesdays and Thursdays, 8:30–10:30, third and fourth periods.* Dr. REED, Dr. LEVINE and associates.

Credit 4 units.

The elective course, offered by members of the Biostatistics and Public Health Practice Departments, is intended primarily for doctoral candidates and other advanced students who require specialized preparation to conduct or administer scientific research on social and community aspects of health, health behavior and health organization. The merits of alternative research designs will be covered by means of lectures, discussions of current research projects, and presentations of students' own research plans. Instruction will cover a range of methods and techniques including survey methods, case and longitudinal studies, as well as relevant statistical techniques, methods of constructing and administering interviews, and other methods of data collection and analysis. Admission is limited and requires the consent of the instructors.

Interdepartmental Course 42a,b,c,d. Seminar on Teaching of Preventive Medicine and Public Health

Seminars. Time to be arranged in all four periods, and individual tutorial work. Dr. LEY, Dr. SEGALL and associates.

Credit 5 units.

The seminars are designed for the students who are preparing for careers as teachers of preventive medicine and public health. Consideration is given to the subject matter of preventive medicine and public health as they are taught in various parts of the world. Case presentations of the preventive aspects of health problems in individual patients, families and communities are discussed. Tutorial work focusses on improving teaching methods. Visiting specialists lead seminars on particular phases of teaching in preventive medicine and public health.

DIVISION OF ENVIRONMENTAL HEALTH SCIENCES AND ENGINEERING

JAMES L. WHITTENBERGER, S.B., M.D., A.M. (hon.), *Head of the Division*

The Division includes the Departments of Industrial Hygiene, Physiology and Sanitary Engineering. The names and titles of the Faculty and Staff members of the Division, and the courses available, are listed in the respective departments.

DIVISIONAL COURSES

Environmental Health 1c. Man's Responses to the Physical Environment

Lectures, demonstrations and field trips. *Mondays, Wednesdays and Fridays, 10:30–12:30, third period.* Dr. FERRIS and associates.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

Physiologic responses evoked by the physical and chemical attributes of man's environment will be described and the limits of such responses emphasized. Methods for assessing and controlling environmental stresses will be presented. Topics covered will include: temperature, humidity, barometric pressure, ionizing radiation, air pollution, toxicology, illumination, and noise.

This course is intended for Master of Public Health candidates who are not specializing in Industrial Hygiene or Occupational Medicine. It is also open to other students who have had Physiology 1a,b or its equivalent and who have had chemistry and physics at a college level.

Environmental Health 1d. Principles of Water and Food Sanitation

Lectures and demonstrations. *Tuesdays and Thursdays, 10:30–12:30, Saturdays, 9:30–11:30, fourth period.* Professor FAIR, Professor THOMAS, Professor MORRIS, and Associate Professor STUMM. The hour from 11:30–12:30 on Thursdays is a discussion period. It is optional and carries no credit.

Credit 2.5 units.

Required of Master of Public Health and Master of Industrial Health candidates. Candidates for the degree of Master of Science in Hygiene may also elect this course.

This course emphasizes some of the broad engineering principles useful in the control of man's environment. These principles are presented in a manner appropriate to students who have no engineering background. Technics of control are discussed, but are presented as illustrations of principle, not as rule-of-thumb procedures that the student is expected to learn by rote. One or two field visits are made to show the application of principles in practice.

The objective of the course is not the conversion of the student into an engineer, ready to design water works, or develop milk-pasteurizing plants, but rather to prepare him to advise, to cooperate with, and to understand the people who are to do the job. It also acquaints him with the nature and extent of the sanitary problem, with what can be and has been accomplished by water and food sanitation, and with what may be expected to be done in the future.

The topics considered include: water supply and purification; the sanitation of swimming pools and bathing beaches; sewerage and sewage treatment; refuse and nightsoil collection and disposal; and food, milk and shellfish sanitation.

Environmental Health 2a,b. Radiological Hygiene

Lectures, laboratories and field trips. *Tuesdays and Thursdays, 1:30–2:30, Fridays, 1:30–4:30, first and second periods.* Dr. YODER and Staff of the Division.

Credit 4 units.

This course will present the essentials of atomic and radiation physics as an introduction to the evaluation of health hazards from ionizing radiation. Students with adequate background in physics and mathematics may be excused from the lecture portion of the course. Credit for the laboratory alone is 1.5 units.

Environmental Health 2c,d. Problems in Radiation Dosimetry

Lectures and laboratories. *Mondays and Wednesdays, 11:30–12:30, Mondays, 2:30–5:30, third and fourth periods.* Dr. SHAPIRO.

Credit 3 units.

Experimental and theoretical methods of evaluating radiation fields and determining radiation dose rates. Laboratory experiments include surveys of neutron fields with foils and proportional counters; measurements of depth dose; X-ray and gamma ray surveys; film dosimetry; scintillation spectrometry.

Environmental Health 3a,b and 3c,d. Occupational Medical Clinics

Clinics, Peter Bent Brigham Hospital, *Saturdays, 9:30–11:30, first and second periods.* Dr. MILLER.

Clinics, Lemuel Shattuck Hospital, *Thursdays, 2:30–4:30, third and fourth periods.* Dr. TYLER.

Credit 1 unit for each clinic series.

Occupational Medical Clinics at teaching hospitals will be offered in all four periods. The clinics at the Peter Bent Brigham Hospital and the Lemuel Shattuck Hospital will emphasize the effect that non-occupational disease may have on the working capacity of the individual.

The clinics are limited to physicians and will not be offered if less than four enroll.

Environmental Health 4c,d. Occupational Medical Clinics

Clinics, Massachusetts General Hospital, *Fridays, 1:30–3:30, third and fourth periods.* Instructor to be announced.

Credit 1 unit.

These clinics are concerned with diseases due to occupation, such as silicosis, beryllium intoxication, coal miner's pneumoconiosis, lead poisoning, etc.

The clinics are limited to physicians and will not be offered if less than four enroll.

Environmental Health 5a,b,c,d. Aviation Health and Safety

Seminars. *Wednesdays, 1:30–3:30, first and second periods; time to be arranged, third and fourth periods.* Dr. MCFARLAND.

Credit 1 unit each period.

The purpose of these seminars is to integrate the work in the basic courses of public health and preventive medicine with the specialized problems of aviation health and safety. Lectures and discussions are arranged throughout the year, led by the students, the instructor, and various biological and medical specialists in the University. Visiting lecturers from other universities and research centers also participate in the seminar.

Admission is by permission of the instructor.

Environmental Health 6c,6d. Human Factors in Occupational Performance and Safety

Lectures and demonstrations. *Fridays, 8:30–10:30, third and fourth periods.* Dr. MCFARLAND.

Credit 1 unit in each period.

In the third period, the lectures and discussions emphasize the application of experimental psychology, anthropology, and biotechnology to the problems of occupational performance and adjustment. Consideration is given to the matching of psychological and physical abilities to job requirements. Emphasis is placed on the importance of designing equipment and work practices in terms of human capabilities and limitations, including those related to fatigue, aging, and environmental stress. In the fourth period the lectures and seminars explore interdisciplinary methods in the analysis and prevention of accidents and injuries. While the major emphasis is on occupational safety, the prevention of other types of accidents is also included.

With permission of the instructor, either period may be taken separately.

Environmental Health 7d. Occupational Medicine

Lectures. *Mondays and Wednesdays, 10:30–12:30, fourth period.* Dr. FERRIS and Dr. WILKINS.

Credit 2 units.

The topics in this course will include the administration and organization of occupational medical departments, physical examinations, rehabilitation, counselling, and medico-legal problems. Guest lecturers will present problems associated with specific industries. The course will not be offered if less than four enroll.

Environmental Health 8c,d. Community Air Pollution

Lectures, demonstrations and seminars. *Fridays, 10:30–12:30, third period; Thursdays, 8:30–10:30, fourth period.* Dr. FIRST and Staff of the Division.

Credit 2 units.

An advanced lecture and seminar course for students in industrial hygiene, sanitary engineering and environmental physiology. It will cover micrometeorology and its relation to air pollution site surveys, community air pollution control and appraisal, and solid waste disposal by incineration.

Environmental Health 15a,b. Divisional Seminar on Health-Related Aspects of Water Resource Management

Seminars. *Wednesdays, 1:30–3:30, first and second periods.* Professor FAIR and Staff of the Division.

Credit 1 unit in each period.

Selected topics in water supply, treatment, and distribution; in waste-water collection, treatment, and disposal; and in nightsoil collection, treatment, and disposal.

This seminar is intended for students who wish to pursue specialized topics in water resource management. Topics for discussion will be selected to meet

the interests of the participants. There may be occasional guest speakers, visits to installations of interest, and presentation of educational media pertinent to the field.

Environmental Health 30e. Field Work

Credit 1 unit.

A week of supervised field observation will be offered from January 27 to February 1, 1964. Students may choose appropriate visits to medical or industrial hygiene departments of industries, airports, and other agencies which have operations or research in the field of environmental health.

DEPARTMENT OF INDUSTRIAL HYGIENE

Leslie Silverman, s.b., s.m., s.m. in eng., s.d., *Professor of Engineering in Environmental Hygiene* and *Head of the Department*

Charles R. Williams, a.b., a.m., ph.d., *Professor of Applied Industrial Hygiene*

George F. Wilkins, a.b., m.d., *Associate Clinical Professor of Occupational Medicine*

Charles E. Billings, s.b. in m.e., s.m., *Associate Professor of Industrial Hygiene Engineering* (Absent 1963–64)

Melvin W. First, s.b., s.m., s.d., *Associate Professor of Applied Industrial Hygiene*

Richard Dennis, s.b., s.m., *Assistant Professor of Industrial Hygiene*

Jacob Shapiro, s.b., s.m., ph.d., *Assistant Professor of Biophysics in Environmental Hygiene*

William A. Burgess, s.b. in m.e., s.m., *Assistant Professor of Environmental Health and Safety Engineering*

Robert E. Yoder, s.b., s.d. in hyg., *Associate in Radiological Hygiene*

Allen D. Brandt, s.b., s.m., s.d., *Visiting Lecturer on Industrial Hygiene Engineering*

Nathan Van Hendricks, b.e., chem.e., *Visiting Lecturer on Industrial Hygiene Engineering*

Lawrence S. Cooke, *Visiting Lecturer on Illumination*

James M. Austin, b.a., m.a., s.d., *Visiting Lecturer on Meteorology and Air Pollution*

Allen L. Cudworth, s.b., s.m., *Visiting Lecturer on Control of Noise in Industry*

Ashley St. Clair, a.b., ll.b., *Visiting Lecturer on Workmen's Compensation*

Horace W. Gerarde, s.b., s.m., m.d., ph.d., *Visiting Lecturer in Industrial Toxicology*

Robert A. Gussman, s.b., s.m., *Research Associate in Industrial Hygiene Engineering*

Charles A. Mitchell, s.b., s.m., *Assistant in Industrial Hygiene*

Shlomo E. Devir, m.sc., dr.phil., *Research Fellow in Industrial Hygiene*

Thomas C. O'Connor, b.sc., m.sc., ph.d., *Research Fellow in Air Pollution Control*

Harriet L. Hardy, a.b., m.d., *Lecturer on Medicine*

Albert O. Seeler, a.b., m.d., *Clinical Associate in Medicine*

Industrial Hygiene 1c,d. Basic Problems in Occupational Health and Industrial Environments

Lectures, laboratories, demonstrations and field trips. *Tuesdays and Thursdays, 8:30–10:30, third period; Tuesdays, 8:30–10:30 and Fridays, 10:30–12:30, fourth period; Wednesdays, 1:30–5, third and fourth periods.* Dr. Silverman, Dr. Ferris and Dr. Seeler.

Credit 7 units.

A course of lectures, demonstrations and inspections showing the relation of working conditions to health with special reference to control of industrial hazards, and of adverse conditions of temperature and humidity, the prevention, diagnosis and treatment of industrial disability and diseases, and workmen's compensation. (This course is classified as Eng. 282.)

Industrial Hygiene 2a,b. Industrial Air Analysis

Laboratory work. *Tuesdays and Thursdays, 2:30–5:30, first and second periods.* Assistant Professor Dennis and Dr. Williams.

Credit 4 units.

Determination and interpretation of adverse conditions found in work places of all types, such as factories and mills, and in assembly halls; methods employed in determining physical properties of the air, such as temperature, humidity, and air motion; atmospheric impurities and normal constituents of the air — gases, dusts, bacteria, and pollens; efficiencies of protective devices such as masks and respirators.

Course 2a,b (Eng. 281) is intended for public health engineers and physicians enrolled in the Industrial Health program.

Industrial Hygiene 6a,b (Engineering 280). Industrial Ventilation and Air Conditioning

Lectures and laboratories. *Mondays and Fridays, 10:30–11:30, Mondays, 1:30–4:30, first and second periods.* Assistant Professor BURGESS and Dr. FIRST.

Credit 4 units.

Selected topics in industrial ventilation and air conditioning of interest to students in mechanical and environmental health engineering and industrial hygiene. Primarily for engineers and physical science majors.

Industrial Hygiene 7c,d (Engineering 286). Aerosol Technology

Lectures and laboratory work, at the School of Public Health. *Mondays and Wednesdays, 10:30–11:30, Thursdays, 2:30–5:30, third and fourth periods.* Dr. YODER.

Credit 4 units.

A general discussion of aerosol properties and their behavior. An advanced course for engineers interested in air pollution evaluation and control.

Prerequisite: Industrial Hygiene 2a,b.

Industrial Hygiene 8c,d (Engineering 287). Radiological Engineering

Lectures. Given at the School of Public Health. Four hours a week, time to be arranged, third and fourth periods. Dr. SHAPIRO.

Credit 4 units.

A presentation of the basic theory and calculations utilized in radiation control and nuclear safety. Introduction to reactor physics; safeguards for preventing criticality and reactor accidents; radiation shielding; radiation damage; environmental reactor hazard analysis.

Prerequisites: Physics 101, Physics 111 or Environmental Health 2a,b.

Industrial Hygiene 17a,b,c,d,e.

Tutorial Program (Reading or Research). Time and credit to be arranged.

Reading or research assignments for individual tutorial work at a Master's degree level will be provided for qualified students in the fields of industrial hygiene, industrial ventilation, aerosol technology, radiological hygiene and air pollution control. Enrollment will be made by arrangement with the Head of the Department.

Industrial Hygiene 20. Research

Properly qualified students at the post-master's level or who have been accepted as doctoral candidates will be given opportunity to pursue inde-

pendent research work on problems of industrial hygiene including occupational disease, toxicology, industrial ventilation, aerosol technology, air pollution control and radiological hygiene. Enrollment will be by arrangement with the Head of the Department.

DEPARTMENT OF PHYSIOLOGY

James L. Whittenberger, s.b., m.d., a.m. (hon.), *James Stevens Simmons Professor of Public Health, Professor of Physiology* and *Head of the Department*

Ross A. McFarland, a.b., ph.d., s.d. (hon.), *Daniel and Florence Guggenheim Professor of Aerospace Health and Safety*

Jere Mead, s.b., m.d., *Associate Professor of Physiology*

Benjamin G. Ferris, Jr., a.b., m.d., *Associate Professor of Environmental Health and Safety*

Edward P. Radford, Jr., m.d., *Associate Professor of Physiology*

Mary O. Amdur, s.b., ph.d., *Associate Professor of Toxicology*

William H. Forbes, a.b., a.m., dr.phil., m.d., *Lecturer on Physiology*

Harben J. Boutourline-Young, m.b.,b.s., m.d., *Assistant Professor of Physiology* (Absent 1963–64)

N. Robert Frank, a.b., m.d., *Assistant Professor of Physiology*

Sheldon D. Murphy, s.b., ph.d., *Assistant Professor of Toxicology*

Roland C. Moore, a.b., a.m., ph.d., *Associate in Industrial Psychology*

Richard G. Domey, s.b., ed.m., ed.d., *Associate in Environmental Health and Safety*

Howard W. Stoudt, Jr., a.b., a.m., ph.d., s.m. in hyg., *Associate in Physical Anthropology*

Hervey B. Elkins, a.b., ph.d., *Lecturer on Industrial Toxicology*

John M. Tyler, a.b., m.d., *Research Associate in Physiology*

Norman H. Mackworth, m.b.,ch.b., ph.d., *Senior Research Associate in Physiological Psychology*

Thomas J. Crowley, s.b., s.m., *Research Associate in Environmental Health and Safety*

Dorothy B. Chamberlin, s.b., m.d., m.p.h., *Research Associate in Physiology*

Vilma R. Hunt, b.d.s., m.a., *Research Associate in Physiology*

John B. Little, a.b., m.d., *Instructor in Physiology*

Mary E. Beck, a.b., m.d., *Research Fellow in Physiology*

LEONARD I. KLEINMAN, A.B., M.D., *Research Fellow in Physiology*
JULES R. SCHWABER, A.B., M.D., *Research Fellow in Physiology*
GEORGE S. TUNE, B.A., PH.D., *Research Fellow in Biotechnology*
DAVID E. LEITH, A.B., M.D., *Research Fellow in Physiology*
HERMAN F. FROEB, A.B., M.D., *Research Fellow in Physiology*
KIMIO KONNO, M.D., *Research Fellow in Physiology*
SERAFETTIN TOMBULOGLU, M.D., *Research Fellow in Physiology*
EIJI YOKOYAMA, M.D., DR.MED.SC., *Research Fellow in Physiology*

CHARLES D. COOK, A.B., M.D., *Associate Clinical Professor of Pediatrics*
ROBERT G. MONROE, A.B., M.D., *Research Associate in Pediatrics*
JOSEPH M. MILLER, A.B., M.D., M.P.H., *Instructor in Medicine*

Physiology 1a,b. Human Physiology

Lectures, laboratory and demonstrations. *Tuesdays, 9:30–10:30, Thursdays, 8:30–10:30, first period; Tuesdays, 9:30–10:30, Thursdays, 9:30–11:30, second period.* Dr. MEAD, Dr FRANK and associates.

Credit 3 units.

This course is intended for students who lack a background in physiology. The time will be divided approximately equally among cellular physiology, organ and organ system physiology, and function of the total organism. The purpose of the laboratory exercises will be to give the students some experience with problems of observing living systems.

Prerequisites: College courses in physics, chemistry and mathematics.

Physiology 2c. Environmental Physiology

Lectures and conferences. *Tuesdays, 4:30–5:30 and Fridays, 1:30–2:30, third period.* Dr. FORBES.

Credit 1 unit.

This course is intended for students specializing in occupational health and will take up in greater detail some of the subjects considered in Environmental Health 1c.

In general students who take Environmental Health 1c should not take Physiology 2c.

The course will begin with a discussion of natural and artificial environments with particular reference to industrial workers. It will then take up human tolerance of high and low temperatures, physical fitness and its measurement, muscular work and the efficiency of various types of muscular work in industry, fatigue, and the effects of age.

Master of Science in Hygiene candidates who wish to take this course must have had Physiology 1a,b or the equivalent.

Physiology 3c,d. Principles of Toxicology

Lectures and laboratory work. *Tuesdays, 3:30–4:30, Fridays, 2:30–5:30, third period; Tuesdays, 3:30–4:30, Fridays, 2:30–3:30, fourth period.* Dr. AMDUR, Dr. MURPHY and Dr. RADFORD.

Credit 2.5 units.

This course will present an introduction to the effects of toxic chemical agents on living organisms with particular reference to experimental techniques of assessing toxicity. Several classes of toxic agents will be studied with respect to mechanisms of action on living tissues, functional changes resulting from exposure, and methods of evaluating the damage produced.

Prerequisite: Physiology 1a,b or equivalent.

Physiology 4d. Special Topics in Respiratory Physiology

Lectures. Two hours a week, time to be arranged, fourth period. Dr. MEAD and associates.

Credit 1 unit.

This course will cover special topics in respiratory physiology, according to the interests of the students. It is intended primarily for students in the aviation medicine program. Other students who are specializing in environmental health may enroll with the consent of the instructor.

Physiology 5c,d. Radiation Biology

Lectures and laboratory work. *Lectures, Mondays, 1:30–2:30 and Tuesdays, 2:30–3:30, third period; Mondays, 1:30–2:30 and Fridays, 3:30–4:30, fourth period; Laboratory, Mondays, 2:30–5:30, third and fourth periods.* Dr. RADFORD.

Credit 3 units.

This course will deal with the biological effects of ionizing radiation. Included will be discussion of radiation biochemistry, mutagenic properties of radiation, acute vs. chronic effects and characteristics of internal and external radiation exposure. During this period students will carry out radiobiological experiments in the laboratory.

Prerequisites: Environmental Health 2a,b, Physiology 1a,b, or equivalents.

Physiology 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Opportunities are provided for tutorial work at a master's degree level in

the fields of respiratory physiology, toxicology, environmental hygiene and occupational medicine.

Physiology 20. Research

Doctoral candidates and other properly qualified students may undertake laboratory or field research by arrangement with the Head of the Department.

DEPARTMENT OF SANITARY ENGINEERING

J. Carrell Morris, s.b., a.m., ph.d., a.m. (hon.), *Gordon McKay Professor of Sanitary Chemistry* and *Acting Head of the Department*

Gordon M. Fair, s.b., s.m. (hon.), dr. ing. (hon.), dr. (hon.), sc.d. (hon.), *Abbott and James Lawrence Professor of Engineering, Gordon McKay Professor of Sanitary Engineering*

Harold A. Thomas, Jr., s.b., s.m., s.d., *Gordon McKay Professor of Civil and Sanitary Engineering*

Werner Stumm, dr.phil., a.m. (hon.), *Associate Professor of Applied Chemistry*

Charles Walcott, a.b., ph.d., *Assistant Professor of Applied Biology*

Myron B. Fiering, a.b., s.m., ph.d., *Assistant Professor of Engineering and Applied Mathematics*

Richard L. Woodward, b.s.c.e., s.m., ph.d., *Senior Research Associate in Sanitary Engineering*

Elisabeth A. M. Stumm, dr.phil., *Research Associate in Applied Biology*

Joseph J. Harrington, b.c.e., a.m., ph.d., *Research Associate in Environmental Health Engineering*

See listing of Environmental Health Courses on page 41 for offerings of this Department in the School of Public Health (Environmental Health 1d and 15a,b).

The following courses of instruction offered in the Division of Engineering and Applied Physics of the Graduate School of Arts and Sciences are open to properly qualified students:

Engineering 270a. Water Resource Engineering. Professor Fair.
Engineering 270b. Water Resource Engineering. Professor Fair.
Engineering 271a. Water Chemistry. Associate Professor Stumm.
Engineering 271b. Processes in Water and Waste Treatment. Professor Morris.

Engineering 272b. Chemistry and Biology of Natural Waters. Associate Professor STUMM and Assistant Professor WALCOTT.
Engineering 273. Water Resource Systems. Professor THOMAS.
Engineering 275. Seminar: Industrial Water and Wastes. Instructor to be announced.
Engineering 276. Advanced Techniques for Water Analysis. Associate Professor STUMM.
Engineering 277. Surface Chemistry. Associate Professor STUMM. (To be omitted in 1963–64).
Engineering 278. Rate Processes. Professor MORRIS.
Engineering 288. Biological Systems. Assistant Professor WALCOTT.
Engineering 289. Applied Electrochemistry. Associate Professor STUMM.
Engineering 292. Chemistry of Nuclear Materials. Professor MORRIS.

DEPARTMENT OF BIOSTATISTICS

ROBERT B. REED, A.B., A.M., PH.D., A.M. (hon.), *Professor of Biostatistics* and *Head of the Department*

JANE WORCESTER, A.B., DR.P.H., *Professor of Biostatistics and Epidemiology*

MARGARET E. DROLETTE, A.B., M.P.H., *Associate in Biostatistics* (Absent 1963–64)

MARVIN N. GLASSER, B.B.A., M.P.H., S.D. IN HYG., *Associate in Biostatistics and Epidemiology*

PAUL M. DENSEN, A.B., S.D., *Visiting Lecturer on Biostatistics*

JANE A. MENKEN, A.B., S.M. IN HYG., *Assistant in Biostatistics*

ANTHONY F. BARTHOLOMAY, A.B., A.M., S.D. IN HYG., *Assistant Professor of Mathematical Biology*

The teaching aims of the Department may be divided very generally into three categories:

First, it is essential for workers in all branches of public health to be able to draw justified conclusions from numerical data and to base logical action on these conclusions. This applies to the administrator who must evaluate problems and the results of his activities, as well as to the epidemiologist and the research worker who must apply statistical technics to their laboratory and field problems. The required course in Biostatistics is therefore designed to give a minimum command of simple statistical methodology to all students.

Second, it is essential for field and laboratory researchers to be able to use statistical methods in planning and analyzing their experiments and problems. Elective courses are designed to provide an introduction to methodology in

this area. These courses are adapted to the needs of students of this School, many of whom have broad backgrounds in biological sciences while few have extensive preparation in mathematics. A minimum of mathematical exposition is therefore included in courses intended for students in these categories. Instead the emphasis is on understanding the statistical procedures and the ability to carry out indicated analyses effectively.

Third, there is a smaller group of students particularly interested in pursuing further work along mathematical lines. Their requirements are fulfilled, on the one hand, by the provision of advanced and seminar courses in the Department; on the other, by the offerings of the Department of Statistics in the Graduate School of Arts and Sciences. Students with mathematical backgrounds who are working in biology, or medical scientists with an understanding of basic mathematics, will be interested in a teaching and research program in Mathematical Biology being developed by Dr. Bartholomay at the Medical School. Properly qualified students at the School of Public Health may arrange for instruction in this area of knowledge.

Training in the use of data processing equipment is available in the Data Processing Center operated by the Department. This Center is equipped with an IBM 1620 Computer and basic punch card machines including a 101 Statistical Sorter. The University Computer Center, located in Cambridge and equipped with an IBM 7090 Computer, also provides an opportunity to study computer technics.

Biostatistics 1a,b. Principles of Biostatistics

Lectures and discussions. *Tuesdays and Thursdays, 8:30–9:30, first and second periods.*

Laboratory. *Mondays, 1:30–4:30, first and second periods.* Staff of the Department.

Credit 3.5 units.

Required of Master of Public Health candidates.

This course is designed for candidates with medical background or other similar thorough preparation in the biological sciences (for the introductory course for other candidates, see page 39). Lectures, discussions and laboratory exercises introduce the student to demographic concepts: the structure of the population and the use of the life table; the nature and composition of rates and their use from administrative and epidemiological points of view. The course forms an introduction to the theory of measurements and distributions, including the testing of significance of differences and the interaction of variables. Finally, the student is introduced to basic concepts of probability and association, sampling technics and construction of controlled experiments such as clinical trials.

Biostatistics 2c,d. Statistical Methods in Research

Lectures, discussions and laboratory. *Tuesdays and Thursdays, 1:30–4:30, third and fourth periods.* Dr. Reed and Dr. Worcester.

Credit 4 units.

This course, a continuation of Biostatistics 1a,b, introduces the student to technical statistical procedures important in problems of laboratory and field research. Topics included are further considerations of probability and correlation together with an introduction to procedures used in the planning of experiments including variance analysis, non-parametric methods, dosage response and maximum likelihood. Statistical technics introduced in advanced courses in epidemiology will be amplified and supplemented.

Prerequisites: Basic preparation in statistics and epidemiology.

Biostatistics 15a,b,c,d. Design of Investigations

Seminars. *Wednesdays, 1:30–3:30, all four periods.* Staff of the Department.

Credit 1 unit in each period.

This course is for students with a major interest in biostatistics. Participants will select a biostatistical problem in apparent need of investigation, and will prepare and present for group discussion a summary of the present status of knowledge of the problem and the design of a study directed towards advancement of present knowledge. Given in conjunction with Epidemiology 15a,b,c,d.

Admission subject to the approval of the Head of the Department.

Biostatistics 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

An opportunity for tutorial work at master's level will be given interested students. This will involve not only work in statistical fields, but can include problems arising in the course of special programs in other departments. Schedules and credit may therefore be arranged jointly with such other departments.

During the week of January 27 to February 1, 1964, opportunity will be provided for studying the use of the equipment of the School's Data Processing Center. Emphasis will be placed on instruction in Fortran programming for the IBM 1620 Computer.

Biostatistics 20. Research

Individual guided research at doctoral level, for candidates for the Doctor of Public Health, Doctor of Science in Hygiene or other doctoral degrees.

The work may be part of the program for a doctorate in this Department or may be integrated with doctoral research in other departments.

DEPARTMENT OF DEMOGRAPHY AND HUMAN ECOLOGY

JOHN C. SNYDER, A.B., M.D., *Henry Pickering Walcott Professor of Microbiology, Acting Head of the Department*

WILLIAM H. FORBES, A.B., A.M., DR.PHIL., M.D., *Lecturer on Physiology, Assistant to the Dean,* and *Faculty Advisor to Foreign Students*

JOHN B. WYON, B.A., M.B.,B.CH., M.P.H., *Assistant Professor of Population Studies*

ANSLEY J. COALE, A.B., A.M., PH.D., *Visiting Lecturer in Demography*

RONALD FREEDMAN, A.B., A.M., PH.D., *Visiting Lecturer in Demography*

ROBERT G. POTTER, JR., A.B., A.M., PH.D., *Visiting Scholar in Demography*

MARY L. NEW, S.B., M.P.H., *Research Associate in Demography and Human Ecology*

STEPHEN J. PLANK, PH.B., A.B., M.D., M.P.H., *Teaching Fellow in Demography and Human Ecology*

The past decade has been marked by the emergence of many new nations and the achievement of self government by a considerable proportion of the population of the world. With these changes have come insistent demands for economic development, for better standards of living, for education, and for improved health conditions. In regions where health measures have been introduced with success, the effects on mortality rates have been striking but birth rates have not decreased concomitantly. The conviction is spreading that the effective application of public health measures in certain areas will result in increases in the population density of such magnitude that economic and social advances will be vitiated.

The Harvard School of Public Health has been involved in studies on population problems since 1953 through an investigation conducted by its Department of Epidemiology in collaboration with the Government of India, the Ludhiana Christian Medical College, and The Rockefeller Foundation. These initial efforts have strengthened the view that the information is inadequate pertaining to the basic factors which determine changes in the density and quality of populations. It is the conviction of the administration of the Harvard School of Public Health that schools of public health and their parent universities should participate actively in the search for the knowledge which communities and nations must have in order to advance towards their goals in education, economic development and health. With this responsibility in mind, the administration of the School has concluded that population problems are foremost among the subjects appropriate for study by the profession of public health. As a step toward meeting this responsibility, a new depart-

ment was established in the Faculty of Public Health in 1962–63 to conduct research and to provide instruction in population problems and those aspects of human ecology which are related to man's efforts to control and change his social environment. When adequate financial support has been obtained, the new department will include experts in the biological and social sciences as well as representatives of the public health sciences. The department is expected to become the focal point for the development of a University-wide Center for Population Studies.

The activities of the new Department of Demography and Human Ecology will be international in scope, and, as in other departments in the Faculty of Public Health, will be concerned with the advancement of knowledge through observation and experiment, placing emphasis partly on the acquisition of knowledge for its own sake and partly on the application of knowledge for the accomplishment of social goals. The development of the courses of instruction which are listed below is the initial step toward a more comprehensive academic program. In the year 1963–64 the formal courses and the tutorial instruction are intended to provide students with an understanding of the interactions between demographic change and health objectives, and to prepare them for effective participation in population programs in various regions, whether as administrators, research workers, or educators.

Demography and Human Ecology 40a,b. Introduction to Ecology and Demography

Lectures, seminars and laboratory exercises. *Fridays, 3:30–5:30, first and second periods.* Dr. Wyon, Dr. Worcester and associates.

Credit 2 units.

In the first part of the course the concept of ecology is developed through studies of plant and animal populations. Application is made to man and his environment. Man is viewed as part of an ecosystem. Factors limiting populations are discussed, and the idea of an ecological concept of cause is developed.

The second part of the course deals with the materials and methods of the demographic study of populations. Particular emphasis is given to measuring the determinants of population change and the effect of the determinants on population composition and population growth.

Demography and Human Ecology 41c,d. Problems of Rapid Population Growth

Seminars. *Fridays, 8:30–10:30, third and fourth periods.* Staff of the Department.

Credit 2 units.

This course applies the concepts of ecology to human populations. The subjects include population theories, the determinants and effects of popula-

tion growth, the principles of human reproduction, and the processes of family building. Small populations are considered with special emphasis on the perceptions of the individuals within these populations and their reactions to their own problems. Attention is directed to identification of the principal factors influencing population problems in areas of the world of direct concern to the students enrolled in the course.

Admission is limited to ten students and is subject to approval of Department staff.

Prerequisite: Demography and Human Ecology 40a,b.

Demography and Human Ecology 17a,b,c,d. Tutorial Program

Time and credit to be arranged.

Students at the master's level may make arrangements for tutorial work and special reading on topics related to the causes or treatment of population problems. There may be an opportunity to consider the design of studies, programs or analysis of data.

Demography and Human Ecology 20. Research

Doctoral candidates may undertake research in the Department or may integrate research in this field with a doctoral program in another department.

Demography and Human Ecology 30e. Field Visits

January 27–February 1, 1964.

Credit 1 unit.

Students majoring in the Department of Demography and Human Ecology participate in field visits to the Demographic Section of the United Nations and to organizations and clinics which are currently active in family planning work.

Additional Field Study

At the end of the academic year a field visit to Puerto Rico is arranged for students majoring in the Department of Demography and Human Ecology. In collaboration with the University of Puerto Rico, an introduction to the demographic, social and economic history of the Island is provided, followed by personal observations of current programs of family planning and community education.

Limited to ten students.

DEPARTMENT OF EPIDEMIOLOGY

Brian MacMahon, M.D., PH.D., D.P.H., S.M. IN HYG., *Professor of Epidemiology* and *Head of the Department*

Jane Worcester, A.B., DR.P.H., *Professor of Biostatistics and Epidemiology*

Thomas F. Pugh, M.D., M.P.H., *Associate Clinical Professor of Epidemiology*

Albert Damon, A.B., PH.D., M.D., *Associate Professor of Epidemiology*

George B. Hutchison, A.B., M.D., M.P.H., *Associate Professor of Epidemiology*

Herbert L. Ley, Jr., M.D., M.P.H., *Associate Professor of Epidemiology and Applied Microbiology*

Ascher J. Segall, M.D., M.P.H., DR.P.H., *Assistant Professor of Epidemiology*

Marvin N. Glasser, B.B.A., M.P.H., S.D. IN HYG., *Associate in Biostatistics and Epidemiology*

Ernest M. Gruenberg, A.B., M.D., M.P.H., DR.P.H., *Visiting Lecturer on Epidemiology*

Morris Siegel, M.D., M.P.H., *Visiting Lecturer on Epidemiology*

Vaun A. Newill, S.B., M.D., S.M. IN HYG., *Visiting Lecturer on Epidemiology*

Eva J. Salber, M.B.,CH.B., D.P.H., M.D., *Senior Research Associate in Epidemiology*

Samuel G. McClellan, A.B., M.D., M.P.H., *Research Associate in Epidemiology*

David C. Poskanzer, A.B., M.D., M.P.H., *Research Associate in Epidemiology*

Theodor Abelin, DR.MED., M.P.H., *Research Fellow in Epidemiology*

Morton A. Levy, A.B., M.D., *Research Fellow in Epidemiology*

Louis Weinstein, S.B., S.M., PH.D., M.D., *Lecturer on Infectious Diseases*

Henry Wechsler, A.B., A.M., PH.D., *Research Associate in Psychology*

The formal courses offered by the Department of Epidemiology are designed primarily for the Master of Public Health curriculum. Epidemiology 1a,b deals with epidemiologic principles and methods as they apply to all varieties of disease, infectious and non-infectious, acute and chronic. Systematic reviews of the infectious diseases are given in Microbiology and Tropical Public Health 1a,b,c and of the non-infectious diseases in Epidemiology 2c,d. Epidemiology 3b, 4c,d and Epidemiology and Microbiology 5d are elective courses for students with special interests.

A major objective of the Department is to encourage original investigation in epidemiology. In addition to tutorial work in a specific research problem (Epidemiology 17), opportunity for experience in study design is provided in Epidemiology 15.

A training program in epidemiology supported by the National Institutes of Health, U.S. Public Health Service, provides opportunities for training in epidemiology at a variety of levels (see page 104). In the selection of graduate candidates for this program, preference will be given to those intending to proceed to investigative work at the doctoral level.

Epidemiology 1a,b. Principles of Epidemiology

Lectures. *Tuesdays and Thursdays, 9:30–10:30, first period; Tuesdays, 9:30–10:30, Thursdays, 9:30–11:30, second period.* Dr. MacMahon and associates.

Credit 2.5 units.

Required of Master of Public Health candidates.

Lectures on the principles, purposes and methods of epidemiology. Illustration is by reference to classic epidemiologic investigations and through laboratory exercises.

Epidemiology 2c,d. Epidemiology of Non-Infectious Disease

Lectures. *Mondays, 8:30–10:30, Wednesdays, 8:30–9:30, third period; Mondays and Wednesdays, 8:30–10:30, fourth period.* Dr. MacMahon and associates.

Credit 3 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

A course concerned with the etiology of those diseases not at present known to be associated with infectious agents. Special attention is given to the mental disorders, to the degenerative and neoplastic diseases, and to the methodologic difficulties associated with the epidemiologic investigation of chronic diseases. Through illustrative studies, problems such as the establishment of criteria for definition, the description of disease course, and the investigation of causal relationships extending over long time periods are discussed. Systematic reviews of the present state of knowledge regarding certain disease states are presented.

Epidemiology 3b. Clinical Problems in Infectious Disease

Lectures. *Tuesdays, 1:30–2:30*; Clinics, *Tuesdays, 2:30–4:30, second period.* Dr. Weinstein.

Credit 1 unit.

Problems of diagnosis, treatment and control of the common acute communicable diseases of temperate climates.

Epidemiology 4c,d. Human Heredity

Lectures. *Tuesdays, 4:30–5:30, Fridays, 1:30–2:30, third and fourth periods.* Dr. Hutchison.

Credit 2 units.

Lectures on the methodology of investigating problems of human heredity and on the current state of knowledge of certain specific areas in this field. Introductory lectures will review the principles of classical genetic theory with particular emphasis on theory peculiar to human genetics.

The methods for investigating family patterns of heredity, twin studies, effects of consanguinity and heterosis, gene linkage and the inheritance of continuous traits, such as height and IQ, will be presented. Students will be given problems illustrating these methods. Current knowledge of the heredity of such factors as mongolism, pyloric stenosis, and the human blood groups will be reviewed.

Epidemiology and Microbiology 5d. Epidemiologic Problems in Infectious Disease

Conferences, seminars, laboratory exercises. *Mondays and Wednesdays, 10:30–12:30, fourth period.* Dr. Ley and associates.

Credit 2 units.

A course given by the staffs of the Departments of Microbiology, Epidemiology and Tropical Public Health providing experience in solving epidemiologic problems in communicable disease.

Epidemiology 15a,b,c,d. Design of Investigations

Seminars. *Wednesdays, 1:30–3:30, all four periods.* Staff of the Department.

Credit 1 unit in each period.

This course is for students with a major interest in epidemiology. Participants will select an epidemiologic problem in apparent need of investigation, and will prepare and present for group discussion a summary of the present status of knowledge of the problem and the design of a study directed towards advancement of present knowledge. Given in conjunction with Biostatistics 15a,b,c,d.

Admission subject to the approval of the Head of the Department.

Epidemiology 17a,b,c,d,e. Introduction to Research

Participation in departmental research in close association with a staff member. Time and credit by arrangement with the Head of the Department.

Prerequisite: Epidemiology 15.

Epidemiology 20. Research

Research for doctoral candidates.

DEPARTMENT OF MATERNAL AND CHILD HEALTH

WILLIAM M. SCHMIDT, S.B., M.D., A.M. (hon.), *Professor of Maternal and Child Health* and *Head of the Department*

ELIZABETH P. RICE, A.B., S.M., *Associate Professor of Public Health Social Work*

LEON STERNFELD, S.B., M.D., PH.D., M.P.H., *Associate Professor of Applied Maternal and Child Health* and *Deputy Commissioner of Health, Commonwealth of Massachusetts*

EDWARD A. MASON, A.B., M.D., *Assistant Professor of Mental Health*

ISABELLE VALADIAN, M.D., M.P.H., *Assistant Professor of Maternal and Child Health*

HAROLD JACOBZINER, S.B., M.D., M.P.H., *Visiting Lecturer on Maternal and Child Health*

ARTHUR J. LESSER, A.B., M.D., M.P.H., *Visiting Lecturer on Maternal and Child Health*

SAMUEL B. KIRKWOOD, A.B., M.D., S.D. (hon.), *Visiting Lecturer on Maternal Health*

EDWIN M. GOLD, S.B., M.D., *Visiting Lecturer on Maternal and Child Health*

ALAN F. GUTTMACHER, A.B., M.D., *Visiting Lecturer on Maternal Health*

HELEN D. COHN, M.P.H., *Instructor in Applied Public Health Nursing*

DEREK ROBINSON, M.B.,CH.B., D.P.H., D.C.H., M.D., *Instructor in Maternal and Child Health*

ILSE E. GORBACH, A.B., M.D., M.P.H., *Instructor in Child Health*

BENJAMIN SACHS, A.B., M.D., M.P.H., *Instructor in Maternal and Child Health*

ARTHUR J. SALISBURY, S.B., M.D., M.P.H., *Instructor in Child Health*

ZELMA B. MILLER, S.B., PH.D., *Senior Research Associate in Maternal and Child Health*

RUTH M. BUTLER A.B., S.M., *Research Associate in Social Work*

MIRIAM C. EKDAHL, S.B., S.M. IN S.S., *Assistant in Social Work*

SYLVIA G. KRAKOW, S.B., M.S.W., *Assistant in Social Work*

RUTH A. COWIN, S.B., S.M., *Assistant in Social Work*

ROBERTA A. SAVITZ, A.B., M.D., *Research Assistant in Maternal and Child Health*

CHARLES A. JANEWAY, A.B., M.D., A.M. (hon.), *Thomas Morgan Rotch Professor of Pediatrics*

DUNCAN E. REID, S.B., M.D., A.M. (hon.), *William Lambert Richardson Professor of Obstetrics*

CLEMENT A. SMITH, A.B., A.M., M.D., A.M. (hon.), S.D. (hon.), *Associate Professor of Pediatrics at the Boston Lying-In Hospital*

WILLIAM BERENBERG, A.B., M.D., *Assistant Clinical Professor of Pediatrics*

ROBERT J. HAGGERTY, A.B., M.D., *Assistant Professor of Pediatrics*

LENDON SNEDEKER, A.B., M.D., M.P.H., *Instructor in Pediatrics*

The teaching program in the Department of Maternal and Child Health is designed to present the principles, major purposes, and methods in maternal and child health. It has three primary objectives:

First, it provides to students in all branches of public health the basic principles underlying the protection of mothers during maternity and of normal and handicapped children. Emphasis is based on total health needs, physical, social, and emotional. Knowledge of health measures and of community services for children and families is also presented.

Second, it provides to students interested in studying maternal and child health more intensively, further knowledge of health problems in this field and the programs and methods developed to serve mothers and children. Program planning, principles of organization, procedures and administration of Maternal and Child Health Services, including organized care of handicapped children, are analyzed. Each student who concentrates in the Department is expected to pursue an independent study of some aspect of maternal and child health which is presented and discussed by the faculty and students in the Department.

Third, it provides to Maternal and Child Health students in doctoral programs, tutorial sessions and guidance with respect to their original investigations in Maternal and Child Health.

Fellowships are available for physicians who have a major interest in Maternal and Child Health. (See Page 105.)

Maternal and Child Health 1b. Principles of Maternal and Child Health

Lectures. *Mondays and Fridays, 8:30–10:30, second period.* Dr. SCHMIDT and associates.

Credit 2 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course presents a systematic review of the principles which underlie programs concerned with maternal and child health, handicapped children, and the related services of child welfare.

Maternal and Child Health 2c,d. Problems and Programs in Maternal and Child Health

Advanced Seminar. *Mondays, 3:30–5:30, Wednesdays, 1:30–3:30, third and fourth periods.* Dr. SCHMIDT and associates.

Credit 4 units.

Presentation and discussion of programs in maternal and child health and of services for handicapped children. Selected aspects of programs are examined with particular reference to the methods of administration in relation to program goals.

A sequence of lecture and discussion sessions is included on social problems and available social services for children.

This course is an advanced course for students majoring in Maternal and Child Health but may be elected by other students with the permission of the Head of the Department.

Maternal and Child Health 3d. Research Approach to Growth, Development and Health of the Child

Seminars. Two hours twice each week, time to be arranged, during the fourth period. Dr. VALADIAN, Dr. REED and associates.

Credit 2 units.

This course deals with the methods for obtaining and evaluating data on child growth, development, and health, and the construction of norms. Particular attention is paid to problems involved in the study of interrelationships between various aspects of the child's progress and between the child and his background and environment.

Illustrative material from the Longitudinal Study of Child Health and Development conducted in this Department since 1930 by Dr. Harold C. Stuart, Professor *Emeritus*, as well as data from other studies in this country and abroad are used.

Admission open to any student subject to approval of instructor.

Maternal and Child Health 15a,b. Departmental Seminar

Seminars. *Wednesdays, 1:30–3:30, first and second periods.* Staff of the Department.

Credit 2 units.

Seminars on topics of special interest in maternal and child health. Presentations by students and by staff of subjects assigned for critical review. Students' previous experience, research in progress, and current reports in the literature will be drawn upon.

Required of students majoring in Maternal and Child Health.

Maternal and Child Health 17b,c,d,e. Tutorial Program

Time and credit to be arranged, second, third and fourth periods.

Students majoring in Maternal and Child Health will devote time to be arranged to individual work under guidance. Each program will be arranged

between the student and advisor during the fall term, and approved in advance by the Head of the Department. In general, such studies will involve a review of the literature, field study, and a paper reporting on the work done.

Students not majoring in Maternal and Child Health may also elect to carry on a study in Maternal and Child Health with permission of the Head of the Department.

Maternal and Child Health 20. Research

Students at the doctoral level may undertake research in Maternal and Child Health by arrangement with the Head of the Department.

Field Study

Students who are accepted for admission and who do not have sufficient experience in Maternal and Child Health may be required to have a period of field study, usually not less than two months, before registration. Students will be encouraged to spend two months, at the end of the academic year, on a field assignment to be arranged for each student by the staff of the Department.

Other field experience may be arranged as time permits.

DEPARTMENT OF MICROBIOLOGY

JOHN C. SNYDER, A.B., M.D., *Henry Pickering Walcott Professor of Microbiology* and *Head of the Department*

GEOFFREY EDSALL, M.D., *Professor of Applied Microbiology* and *Superintendent of Institute of Laboratories, Department of Public Health of Massachusetts*

EDWARD S. MURRAY, A.B., M.D., M.P.H., *Associate Professor of Microbiology* and *Assistant Physician to University Health Services*

SAMUEL D. BELL, JR., A.B., M.D., M.P.H., *Associate Professor of Microbiology*

ROBERT S. CHANG, B.SC., M.D., S.D. IN HYG., *Associate Professor of Microbiology*

CHARLOTTE C. CAMPBELL, S.B., *Associate Professor of Medical Mycology*

HERBERT L. LEY, JR., M.D., M.P.H., *Associate Professor of Epidemiology and Applied Microbiology*

ROGER L. NICHOLS, A.B., M.D., *Assistant Professor of Applied Microbiology* (Absent 1963–64)

ROBERT A. MACCREADY, S.B., M.D., *Associate in Microbiology* and *Director of Diagnostic Laboratories, Department of Public Health of Massachusetts*

JAMES A. MCCOMB, D.V.M., *Associate in Public Health Immunology* and *Director of Biologic Laboratories, Department of Public Health of Massachusetts*

ROBERT B. PENNELL, S.B., S.M., PH.D., *Lecturer on Immunology*

HERALD R. COX, A.B., S.D., S.D. (hon.), *Visiting Lecturer on Microbiology*

ROBERT J. HUEBNER, M.D., *Visiting Lecturer on Microbiology*

JOHN H. HANKS, S.B., PH.D., *Visiting Lecturer on Microbiology*

CHARLES H. RAMMELKAMP, A.B., M.D., S.D. (hon.), *Visiting Lecturer on Microbiology*

NADIM A. HADDAD, B.A., M.D., M.P.H., *Research Associate in Microbiology* (Absent 1963–64)

JOHN W. VINSON, S.B., S.D. IN HYG., *Research Associate in Microbiology*

KENNETH F. GIRARD, S.B., M.SC., PH.D., *Research Associate in Microbiology*

MARIA EBE RECA, DR.CHEM., *Research Associate in Medical Mycology*

DOROTHY E. MCCOMB, S.B., *Assistant in Microbiology*

LEO LEVINE, S.B., *Assistant in Microbiology*

JANE M. D. O'CONNOR, S.B., *Assistant in Microbiology*

GRACE C. YUAN, B.S., M.D., *Research Assistant in Microbiology*

HERMAN POLET, M.D., *Research Fellow in Microbiology*

AUGUSTO B. MARTINS, B.SC., M.SC., DR.PHIL., *Research Fellow in Microbiology*

The Department of Microbiology is concerned with the bacteria, rickettsiae, and viruses which cause the principal communicable diseases of public health importance. The staff members have many interests in common with the Departments of Epidemiology and Tropical Public Health. The courses in microbiology are intended primarily for students with a background in the medical and biological sciences.

The basic course, Microbiology-Tropical Public Health 1 a,b,c is designed to provide the students in the Master of Public Health program with the factual information and the principles of microbiology and parasitology which are essential to a general understanding of the field of public health.

The advanced courses of the Department are planned for students whose major interests lie in some aspect of the communicable diseases. The titles and descriptions as listed below indicate the scope of the instruction offered by the Department.

Students who are interested in learning research technics and in undertaking original investigation may register for Microbiology 17 during their first year, or Microbiology 20 after they have acquired technical skill in handling pathogenic microorganisms. These two courses provide the opportunity to work in close association with a member of the staff on research problems in specific areas as listed under Course 20 below. Present Departmental interests include the rickettsiae and certain viruses; the biological aspects of host-parasite relations, and the properties of human cells in tissue culture; and

immunological problems, including statistical and field assay technics. Entomological problems of certain types are also within the scope of the research interests and facilities of the Department.

A program supported by the National Institutes of Health is available to assist qualified applicants who desire training in infectious disease, including rickettsial, viral, bacterial and mycological infections.

Microbiology and Tropical Public Health 1a,b,c. Ecology and Epidemiology of Infectious Diseases

Lectures, seminars, conferences and laboratory exercises. *Tuesdays and Thursdays, 10:30–11:30, Wednesdays, 9:30–10:30, Thursdays, 1:30–4:30, first period; Tuesdays, 10:30–11:30, Wednesdays, 9:30–10:30, Thursdays, 11:30–12:30 and 1:30–4:30, second period; Tuesdays and Thursdays, 10:30–12:30, Wednesdays, 9:30–10:30, third period.* Dr. SNYDER, Dr. WELLER and the Staff of the two Departments.

Credit 6 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course is under the general direction of Drs. Snyder and Weller, with the collaboration of the staff of the Departments of Microbiology, Tropical Public Health and Epidemiology. The purpose of the course is to provide students in the Master of Public Health program with the basic knowledge of the communicable and infectious diseases, including the relevant ecologic factors which pertain directly to their prevention and control.

Microbiology and Tropical Public Health 1 a,b,c is designed for students who have had most of the courses given in the first two years of medical school or their equivalent. The exercises include discussions of the present status of infectious diseases in tropical and temperate climates and the technics available for study of microorganisms and parasites, with special reference to recent methods which have opened a new era in microbiology. The course emphasizes the principal diseases of public health importance. The subjects are presented by etiologic agent, including protozoa, helminths, viruses, rickettsiae, spirochetes and bacteria.

Approximately two-thirds of the time will be devoted to lectures and one-third to conferences, seminar discussions, and laboratory exercises. In the laboratory the student is expected to acquire an understanding of the potentialities as well as the limitations of pertinent public health laboratory procedures.

Microbiology 2d. Current Research in Microbiology

Tuesdays, 8:30–10:30, fourth period. Dr. SNYDER.

Credit 1 unit.

This course is arranged for the students who are concentrating in microbiology, epidemiology or tropical public health. Important papers from current periodicals on topics of general interest are assigned to the students for presentation. These papers are reviewed critically in respect to evaluation of the experimental work, analysis of the results, organization of the manuscripts, and clarity of presentation.

The purpose of the course is to develop the ability of the students to read the literature analytically and to plan their own work and manuscripts effectively.

Epidemiology and Microbiology 5d. Epidemiologic Problems in Infectious Disease

Conferences, seminars, laboratory exercises. *Mondays and Wednesdays, 10:30–12:30, fourth period.* Dr. LEY and associates.

Credit 2 units.

A course given by the staffs of the Departments of Microbiology, Epidemiology and Tropical Public Health providing experience in solving epidemiologic problems in communicable disease.

Microbiology 11c. Public Health Laboratory Procedures

Lectures, seminars, and laboratory exercises. *Mondays and Fridays, 1:30–4:30, Wednesdays, 3:30–4:30, third period.* Dr. MURRAY, Dr. CHANG, Dr. BELL and Dr. MACCREADY.

Credit 2 units.

This course provides the opportunity to become familiar with the technics in use by public health laboratories for the diagnosis of the common bacterial and viral diseases. Some of the exercises are devoted to methods recently developed for the study of various microorganisms. The exercises are designed for orientation of the epidemiologist as well as the microbiologist, with particular reference to the potentialities and limitations of laboratory technics in the conduct of field investigations of communicable diseases.

Short exercises illustrate the important principles of tests in serology and bacteriology, and the students themselves inoculate embryonated eggs and animals by various routes, prepare diagnostic antigens, and perform neutralization tests and red cell agglutination tests.

Limited to fourteen students who are enrolled in Microbiology-Tropical Public Health 1 a,b,c.

Microbiology 12c. Applied Immunology: Biological Products in Public Health

Seminars and laboratory demonstrations at the Institute of Laboratories of

the Massachusetts Department of Public Health. Time to be arranged, third period. Dr. Edsall and Staff of the Institute of Laboratories.

Credit 1 unit.

This course deals with the immunological principles underlying the preparation, evaluation and use of serums, vaccines and other biologic products used in public health practice. The design and interpretation of laboratory and field tests of biologic products, the estimation of their safety and effectiveness, and related questions will be discussed. Each participant will present an oral and written report on a specific problem of current importance.

Opportunities are offered properly qualified students for original work at the Institute in problems of public health immunology with credit for Microbiology 17 or 20 to be arranged with the Head of the Department.

Microbiology 13d. Rickettsial and Viral Diseases of Public Health Importance

Lectures, laboratory exercises, and seminars. *Mondays and Fridays, 1:30–4:30, fourth period*, and four hours per week individual laboratory work. Dr. Chang, Dr. Bell and Dr. Murray.

Credit 3 units.

The purpose of this course is to teach the basic principles and technics for laboratory study of certain rickettsiae and viruses which are of interest to public health workers. The course consists of lectures, seminars, supervised individual work, and laboratory exercises. The latter include methods for identification of representative species of rickettsiae and viruses of public health importance by the use of tissue culture, animal inoculation, and serologic technics.

The arthropods which are vectors or reservoirs of the major viral and rickettsial diseases are briefly considered at appropriate points in the exercises.

The course is planned as a basic preparation for those who will be involved in original research on rickettsiae or viruses either in the laboratory or the field.

Limited to ten students who have completed Microbiology 11c or who have had equivalent previous preparation.

Microbiology 15a,b,c,d. Seminars in Microbiology

Seminars. *Wednesdays, 1:30–3:30, all four periods.*

Credit 1 unit in each period.

Seminars on topics of special interest in microbiology. These vary from presentations by students of subjects assigned for analysis and review to reports by staff members and advanced students of research work in progress in the Department.

This course is required for students majoring in microbiology.

Microbiology 17a,b,c,d,e. Introduction to Research

Time and credit to be arranged with the Department Staff.

Students without previous experience in research may register for supervised laboratory work in one of the areas listed under Course 20 below.

Microbiology 20 a,b,c,d. Research

Doctoral candidates or full-time special students who have completed the advanced courses in microbiology in the Department may undertake original investigation by arrangement with the Head of the Department.

There are six general areas currently under investigation by members of the Department:

(a) Serological problems as studied by technics of fluorescent antibody, complement fixation, and immunoelectrophoresis (Dr. Murray and Dr. Nichols).

(b) Biologic studies of rickettsiae and the psittacosis-lymphogranuloma-trachoma viruses (Dr. Murray, Dr. Bell, Dr. Ley and Dr. Vinson).

(c) Virology and cell biology (Dr. Chang).

(d) Experimental infection of laboratory-reared lice and fleas (Dr. Murray and Dr. Vinson).

(e) Antigenic analysis of systemic pathogenic mycotic agents; ecologic and epidemiologic problems associated with systemic mycotic diseases and agents; microenvironmental studies on the systemic pathogenic fungi (Miss Campbell).

(f) At the Institute of Laboratories, Massachusetts Department of Public Health, students may participate in studies related to the development, preparation, testing, characterization and evaluation of biologic products, on the diagnosis of infectious disease, or the characteristics of infectious agents or on related aspects of epidemiology, microbiology and immunology (Dr. Edsall and Dr. Ley).

DEPARTMENT OF NUTRITION

FREDRICK J. STARE, S.B., S.M., PH.D., M.D., A.M. (hon.), S.D. (hon.), *Professor of Nutrition* and *Head of the Department*

DAVID M. HEGSTED, S.B., S.M., PH.D., A.M. (hon.), *Professor of Nutrition*

ROBERT P. GEYER, S.B., S.M., PH.D., *Associate Professor of Nutrition*

JEAN MAYER, B.A., B.SC., M.SC., PH.D., D.SC., *Associate Professor of Nutrition* and *Lecturer on the History of Public Health*

MARTHA F. TRULSON, S.B., M.P.H., S.D. IN HYG., *Associate Professor of Nutrition*

STEPHEN B. ANDRUS, S.B., M.D., *Assistant Professor of Pathology*

STANLEY N. GERSHOFF, A.B., S.M., PH.D., *Assistant Professor of Nutrition*

OSCAR W. PORTMAN, S.B., M.D., *Assistant Professor of Nutrition*

JOSEPH J. VITALE, S.B., S.M., S.D. IN HYG., *Assistant Professor of Nutrition*

BERNARD LOWN, S.B., M.D., *Assistant Professor of Medicine*

MARIA BANASIEWICZ-RODRIGUEZ, M.D., M.P.H., *Associate in Nutrition*

ROBERT B. MCGANDY, A.B., M.D., M.P.H., *Associate in Nutrition*

MADGE L. MYERS, A.B., S.M., *Instructor in Nutrition*

PATRICIA A. STEFANIK, S.B., S.M., *Instructor in Nutrition*

EDWIN L. PRIEN, A.B., A.M., M.D., *Clinical Research Associate in Nutrition*

F. RUSSELL OLSEN, A.B., *Research Associate in Nutrition*

ROBERT E. CLANCY, M.D., *Research Associate in Medicine*

OSCAR M. JANKELSON, M.D., *Research Associate in Medicine*

CARL C. SELTZER, A.B., PH.D., *Research Associate in Physical Anthropology*

ETHEL J. BOWIE, S.B., *Assistant in Nutrition*

DOROTHY BRUNO, S.B., *Assistant in Nutrition*

KATHLEEN M. BROELL, S.B., S.M. IN HYG., *Assistant in Nutrition*

LENORE F. MONELLO, A.B., A.M., *Assistant in Nutrition*

HAROLD E. LEWIS, B.SC., M.B.,CH.B., *Senior Research Fellow in Nutrition*

KATSUTAKA SETA, M.D., DR.MED.SC., *Research Fellow in Nutrition*

MICHIHIRO SUGANO, B.S., M.S., PH.D., *Research Fellow in Nutrition*

WERNER STAUFFACHER, M.D., *Research Fellow in Nutrition*

AGNES M. HUBER, B.SC., PH.D., *Research Fellow in Nutrition*

BEVERLY ANNE BULLEN, S.B., S.M., S.M. IN HYG., S.D. IN HYG., *Research Fellow in Nutrition*

ANIK A. GIRARD, B.A., D.V.M., *Research Fellow in Nutrition*

HIROSHI OKANIWA, M.D., DR.MED.SC., *Research Fellow in Nutrition*

James H. Shaw, b.a., s.m., ph.d., a.m. (hon.), *Associate Professor of Biological Chemistry, Harvard School of Dental Medicine*

Ira Gore, a.b., m.d., *Lecturer on Pathology*

Norman Zamcheck, a.b., m.d., *Clinical Associate in Medicine*

Earl E. Hellerstein, a.b., m.d., *Associate in Pathology*

Daniel S. Bernstein, a.b., m.d., *Instructor in Medicine*

Harold J. White, s.b., m.d., *Instructor in Pathology*

The Department of Nutrition is concerned with basic and applied investigations in the science of nutrition in the areas of biochemistry, physiology, and pathology. Many of these are oriented toward problems of contemporary public health importance, such as cardiovascular disease, obesity, and cancer. The Department also has programs dealing with general nutritional and health problems in various countries in South America, Africa, and Asia.

In addition to the courses available in the School of Public Health, students may take graduate courses in the other Schools of Harvard University and at the Massachusetts Institute of Technology. Thus, a program leading to the Doctor of Science degree might include courses in nutrition, biochemistry, biostatistics and epidemiology, physiology, and bacteriology, as well as advanced courses in these and related fields, such as organic and physical chemistry and biology. Appropriate programs are available for individuals whose interests lie in community nutrition rather than in laboratory nutrition and biochemistry.

Nutrition 1a,b. Public Health Nutrition

Lectures. *Wednesdays, 10:30–12:30, first and second periods; Fridays, 11:30–12:30, first period.* Dr. Stare and Staff of the Department.

Credit 2.5 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course deals with the science of nutrition and its application to problems of human nutrition. Approximately one half of the lectures are devoted to basic and clinical nutrition. Dietary requirements are considered in relation to growth, development, pregnancy, lactation and disease states. Methods for establishing and meeting nutrition requirements, especially in countries with unfavorable economic conditions, are discussed. The etiology, treatment and prevention of diseases related to nutritional factors are considered. Content also includes nutrition surveys and their evaluation, the place of the nutritionist in the public health program, and the nutritional problems of relief, rehabilitation, famine and other emergencies. The relation of production, distribution and preparation for the best use of foods is discussed, as are the problems of food enrichment, fortification and faddism.

Seminar sessions are arranged for small groups. Active student participation is expected.

Nutrition 2c,d. Advanced Topics in Nutrition

Lectures, discussions and required reading. *Wednesdays, 1:30–3:30, Fridays, 8:30–10:30, third period; Wednesdays, 1:30–3:30, fourth period.* Dr. HEGSTED, Dr. MAYER and Dr. GERSHOFF.

Credit 3 units.

The chemistry, function and metabolism of carbohydrates, fats, proteins, vitamins and essential minerals are considered in detail. Mechanisms of regulation and behavioral aspects of food and fluid intake, calorimetry, genetic factors in nutrition, comparative requirements of various species are examined.

This course is intended primarily for students majoring in nutrition but can be taken by other adequately prepared students by consent of the instructors.

Nutrition 3c,d. Laboratory Technics

Lectures and demonstrations. *Wednesdays, 3:30–5:30, third and fourth periods.* Dr. GEYER, Dr. PORTMAN and Dr. VITALE.

Credit 2 units. Additional credits can be arranged for those desiring extra laboratory instruction.

This course is a survey of methods pertinent to laboratory research. The material covered includes biophysical and chemical technics. Students participate in the preparation and presentation of such general topics as chromatography, spectroscopy, microbiological assay, manometric measurements, and purified diet technics. They are then instructed in the actual laboratory procedure pertaining to these technics.

Prerequisites: A basic course in biochemistry and consent of instructor.

Nutrition 4d. Clinical and Pathologic Aspects of Nutritional Disease

Lectures, demonstrations and seminars. *Mondays, 10:30–12:30, fourth period.* Dr. LOWN, Dr. MCGANDY and Dr. VITALE.

Credit 1 unit.

This course is concerned with the intermediate metabolism of various selected nutrients, with especial emphasis upon clinical aspects. The discussions will orient to the most recent advances in biochemistry and physiology.

Nutrition 5d. Nutritional Surveys

Lectures, discussions and laboratory exercises. *Fridays, 10:30–12:30, fourth period.* Dr. TRULSON, Dr. GERSHOFF and Dr. MCGANDY.

Credit 1 unit.

Methods of obtaining dietary information, principle of nutritional surveys; assessment of nutritional status in public health programs and clinical research are examined and discussed. Laboratory work will consist of practical exercises in evaluating diets and surveys.

Nutrition 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Individual work, under direction, may be arranged for students at the master's level. This may include laboratory studies or projects in applied nutrition.

Nutrition 20. Research

Time and credit to be arranged.

Facilities are available for students at the doctoral level to do advanced work in nutrition along the lines of fundamental research or applied nutrition in public health and medicine.

Admission limited and subject to approval of the instructor.

DEPARTMENT OF PUBLIC HEALTH PRACTICE

ROBERT H. HAMLIN, A.B., B.S.M., M.B., M.D., M.P.H., LL.B., *Roger Irving Lee Professor of Public Health, Director of the Interfaculty Program on Health and Medical Care* and *Head of the Department*

ALFRED L. FRECHETTE, M.D., M.P.H., *Clinical Professor of Public Health Practice* and *Commissioner of Public Health, Commonwealth of Massachusetts*

LEONID S. SNEGIREFF, M.D., M.P.H., DR.P.H., *Associate Professor of Chronic Disease Control*

GERALD CAPLAN, B.SC., M.B.,CH.B., D.P.M., M.D., *Associate Professor of Mental Health*

SOL LEVINE, A.B., A.M., PH.D., *Associate Professor of Social Psychology*

ELIZABETH P. RICE, A.B., S.M., *Associate Professor of Public Health Social Work*

MARJORIE A. C. YOUNG, S.B., ED.M., M.P.H., DR.P.H., *Associate Professor of Health Education*

WALLACE H. BEST, A.B., A.M., PH.D., *Lecturer on Public Administration*

EDWARD A. MASON, A.B., M.D., *Assistant Professor of Mental Health*

LOUISA P. HOWE, A.B., A.M., PH.D., *Assistant Professor of Mental Health*

SYDNEY H. CROOG, A.B., A.M., PH.D., *Assistant Professor of Sociology*

LENIN A. BALER, A.B., A.M., PH.D., S.M. IN HYG., S.D. IN HYG., *Assistant Professor of Mental Health*

ROY PENCHANSKY, S.B., M.I.L.R., D.B.A., *Assistant Professor of Administration in Medical Care*

NORMAN A. SCOTCH, A.B., A.M., PH.D., S.M. IN HYG., *Assistant Professor of Social Anthropology*

CHARLOTTE E. OWENS, S.B., M.P.H., *Associate in Mental Health*

HARRY T. PHILLIPS, M.B.,CH.B., D.P.H., M.D., *Lecturer on Public Health Practice*

LEON J. TAUBENHAUS, A.B., M.D., M.P.H., *Lecturer on Public Health Practice*

RHONA V. RAPOPORT, B.SC., PH.D., *Lecturer on Mental Health*

BELLENDEN R. HUTCHESON, S.B., M.B., M.D., *Lecturer on Mental Health*

EDWARD B. KOVAR, A.B., A.M., *Lecturer on Public Health Practice*

OLIVE M. LOMBARD, B.SC., S.M. IN HYG., *Instructor in Public Health Practice*

MARY D. BAIN, A.B., M.D., *Instructor in Mental Health*

SAUL COOPER, A.B., A.M., *Instructor in Mental Health*

JOHN G. MCCORMICK, S.B., S.M., *Instructor in Health Education*

ELIZABETH K. CASO, S.B., S.M., S.M. IN HYG., *Instructor in Nutrition (Chronic Disease)*

FRANCES H. PITTS, S.B., S.M., M.P.H., *Instructor in Health Education*

DONALD OTTENSTEIN, S.B., M.D., *Instructor in Mental Health*

JAMES E. TEELE, A.B., A.M., PH.D., *Research Associate in Sociology*

WILLIAM J. RYAN, A.B., A.M., PH.D., *Research Associate in Mental Health*

PEGGY J. GOLDE, A.B., PH.D., *Research Associate in Mental Health*

DOUGLAS F. HOOPER, B.A., PH.D., *Research Associate in Mental Health*

ALAN P. SHELDON, B.A., M.B.,B.CHIR., M.A., D.P.M., S.M IN HYG., *Research Assistant in Mental Health*

CHARLES M. BRYANT, A.B., M.D., M.P.H., *Teaching Fellow in Public Health Practice*

ERICH LINDEMANN, DR.PHIL., M.D., A.M. (hon.), *Professor of Psychiatry*

SHIELDS WARREN, A.B., M.D., S.D. (hon.), LL.D., *Professor of Pathology at the New England Deaconess Hospital*

SIDNEY FARBER, S.B., M.D., DR.P.H. (hon.), S.D. (hon.), *Professor of Pathology at the Children's Hospital*

JAMES M. DUNNING, A.B., D.D.S., M.P.H., *Clinical Professor* and *Head, Department of Ecological Dentistry, Harvard School of Dental Medicine* and *Director, Dental Health Service, University Health Services*

WILLIAM J. CURRAN, LL.B., LL.M., S.M. IN HYG., *Lecturer on Legal Medicine, Harvard Law School, (Utley Professor of Legal Medicine, Director, Law-Medicine Research Institute, Boston University)*

Mary Lee Ingbar, s.b., a.m., ph.d., m.p.h., *Research Associate in the Graduate School of Public Administration*

Gerald D. Rosenthal, a.b., s.m., ph.d., *Instructor in Economics*

The Department has specific objectives in education, research and community service.

In *education* the Department seeks:

(a) To develop leaders in planning and operating an integrated system of community health services who will be prepared to analyze and to deal with the changing administrative problems and patterns of service in the future. Such leaders should be competent to organize, administer, and evaluate service, education, and research programs.

(b) To educate leaders in special fields of public health for which the Department has particular responsibility. At present these areas are: chronic disease control and gerontology, community mental health, health education, medical care administration, public health dentistry, public health nursing, public health social work, and social science in public health.

(c) To provide opportunities for students concentrating in other departments of the School to develop an appreciation of the relationships between their own special field and other public health programs, professional disciplines, and the environment in which they will work.

(d) To provide an understanding of the major concepts and research methodology of the social sciences for those students whose future activities will require this knowledge.

In *research*, the Department seeks to stimulate and conduct research in the special fields of public health for which the Department is responsible. Particular interests include psychosocial and sociocultural factors in health and disease, analysis of the content and method of providing health services in the United States and other countries, and identification of means to make available the increasing scientific technology to the general public.

In *service*, it is the Department's objective to provide consultation and community service to the extent that it is consistent with the development and maintenance of a strong educational and research program in the administration of health services.

Field Study

Students majoring in the Department of Public Health Practice whose previous experience in public health is limited are expected to spend two months either before the beginning or after the end of the academic year on a field assignment to be planned with the Department.

All students majoring in the Department are encouraged to spend at least

six weeks at the end of the academic year on a field assignment to be arranged for each student by the staff of the Department.

Public Health Practice 1a,b. Public Health Administration I

Lectures and discussions. *Mondays, 10:30–12:30, and Fridays, 10:30–11:30, first period; Mondays and Fridays, 10:30–12:30, second period.* Dr. HAMLIN and associates.

Credit 3 units.

Required of Master of Public Health candidates.

This course presents basic knowledge needed in the planning, organization, management, and evaluation of governmental and nongovernmental health programs, including personal health and environmental health services.

Among the subjects considered are the dimensions and characteristics of the health agency complex, manpower resources and role relationships in public health, administrative concepts including personnel and fiscal management, program development in such special areas as mental health and medical care, sociocultural concepts involved in health planning, and comparative administration of health programs in the United States and other countries.

Public Health Practice 2c,d. Public Health Administration II

Seminars. *Mondays and Fridays, 1:30–3:30, third and fourth periods.* Dr. HAMLIN, Dr. BEST and associates.

Credit 4 units.

An advanced seminar for students majoring in public health administration or students from other departments whose future careers will involve significant administrative responsibilities.

The seminar analyzes in depth the role of the administrator, regardless of professional discipline, in the management and decision-making processes of a variety of health agencies and health programs in the United States and other countries.

Required of all students majoring in the Department of Public Health Practice unless they have had previous equivalent training and experience.

Public Health Practice 1a,b is a prerequisite and Interdepartmental Course 1a is recommended.

Public Health Practice 3b. The Development of Personality in Health and Disease

Lectures and seminars. *Tuesdays, 1:30–3:30, second period.* Dr. RAPOPORT and Dr. CAPLAN.

Credit 1 unit.

This course discusses concepts of personality structure and functioning in

relation to work in the public health field. Factors which influence the development of healthy and unhealthy personality are discussed. Special attention is given to genetic, prenatal, and paranatal organic factors; to the influence of parent-child relationships; to the long term and short term effects of the psycho-social milieu of the family; and to the sociocultural influences at work in the neighborhood and in the community. The unfolding of personality over the life span is studied, and the effects of life crises which are the reactions to hazardous environmental circumstances and to physiological changes such as pregnancy and bodily illness are analyzed. These considerations are then used as a basis for conceptualizing the etiological forces in the processes of mental health and mental ill health.

This course is introductory to Public Health Practice 9c,d.

Public Health Practice 4b,c. Control of Chronic Disease and Its Relation to Gerontology and Rehabilitation

Lectures and seminars. *Fridays, 1:30–3:30, second period; Fridays, 3:30–5:30, third period.* Dr. Snegireff and associates.

Credit 2 units.

This course is designed to present and discuss some of the major problems in the control of chronic disease and of cancer in all age groups. Rehabilitation is presented as an integral part of chronic disease control.

Authorities in the various fields and program directors discuss specific phases of selected problems. Official and voluntary health agency programs and their implementation at the community level are discussed. Aging as a major medical, socioeconomic, and psychological problem is reviewed. Emphasis is given to the newer methods of detection of disease, home care, and nursing home care. Current research studies are considered.

Public Health Practice 5c,d. Health Education

Seminars. *Thursdays, 1:30–3:30, third and fourth periods.* Dr. Young and associates.

Credit 2 units.

This seminar emphasizes communication theory, models of health behavior, health education in the change process, psychosocial and cultural factors relevant to program planning in health education, and research and evaluation in health education. Major focus of the seminar is on community health programs, including school health services.

Public Health Practice 6c,d. Group Process

Seminars. *Thursdays, 3:30–5:30, third and fourth periods.* Staff of the Department.

Credit 2 units.

The purpose of the seminar is to increase participants' sensitivity to phenomena occurring in face-to-face groups, to provide the theoretical and conceptual framework for understanding the reasons for these phenomena, to help students increase their own skills as group participants, and to stimulate interest in systematic observation and study of small group behavior.

Permission of the Head of the Department is required for enrollment in this course.

Public Health Practice 7c. Principles of Supervision and Consultation.

Seminars. Miss Rice. (To be omitted in 1963–64.)

Public Health Practice 8d. Legal Problems of Organized Health Programs

Seminars. *Fridays, 8:30–10:30, fourth period.* Mr. Curran.

Credit 1 unit.

The seminar is primarily designed for those who are or who may become administrators and policy-makers, including health officers, nurse supervisors, medical care personnel, sanitary engineers, or other similar personnel, in public or private agencies. Seminars will include discussions on: (a) utilization of the law in implementing health programs; (b) the liability of health personnel and health organizations in the operation of their programs; (c) the development and comparison of legal and medical standards of practice, particularly how these standards on a legal basis may be used to increase and maintain the quality of health programs; (d) the preparation of health department regulations; (e) the preparation and presentation of medical evidence for hearings, court procedures, etc.; (f) the legal problems of disease control; and (g) various legal and administrative forms of health practice.

Public Health Practice 9c,d. Administrative Aspects of Community Mental Health Programs

Seminars. *Tuesdays, 1:30–3:30, third and fourth periods.* Dr. Caplan.

Credit 2 units.

This course is designed for mental health specialists and other students who are interested in administrative aspects of organizing programs for the prevention, control, and rehabilitation of mental disorders at the federal, state, and local levels.

Administrators from selected mental health and public health programs are questioned by the instructor and class to permit students to identify with the administrators in their perception of administrative problems, to gain understanding of the administrators' techniques and personal styles, and to see how administrators implement their decisions.

Public Health Practice 11c,d. Health and Illness in Cross-Cultural Perspective

Seminars. *Mondays, 3:30–5:30, third and fourth periods.* Dr. LEVINE, Dr. SCOTCH and associates.

Credit 2 units.

This course, also listed as Social Relations 283, is designed for public health students who seek greater familiarity with social and cultural aspects of medicine in this and other countries, and for social science students interested in health and health services as a research area. Much of the course consists of presentations by experts conducting specific studies of a sociomedical nature, followed by informal class discussion. Admission is limited and requires consent of the instructor.

Public Health Practice 13c,d. Dental Public Health Practice

Conferences, seminars and field study. Time and credit to be arranged. Dr. DUNNING and associates.

This course is designed particularly for dentists. Emphasis is laid on the application of such sciences as epidemiology and biostatistics to dental problems and upon public health administration in the dental field.

Opportunities for clinical experience are available at the Harvard School of Dental Medicine under certain circumstances.

Public Health Practice 15a,b,c,d. Departmental Seminars

Seminars. *Wednesdays, 1:30–3:30, in all four periods,* and additional time to be arranged in special cases. Staff of the Department.

Credit 4–8 units.

Two seminar groups for students majoring in the Department of Public Health Practice, one in General Public Health Administration and the other in Community Mental Health.

Section I. The General Public Health Administration seminar emphasizes administrative theory, the analytical and decision-making processes in program planning and evaluation, and research methods applied to problems of administration.

Section II. The Community Mental Health seminar for students specializing in that field relates general public health knowledge to the conceptual framework for comprehensive community psychiatry. Special attention is devoted to the theory and practice of preventive psychiatry with particular reference to techniques of mental health consultation and community organization.

Either seminar is required for students majoring in the Department of Public Health Practice. Students from other departments may be admitted by special arrangement.

Public Health Practice 17a,b,c,d,e. Tutorial Program

Time and credit to be arranged.

Students at the master's level may make arrangements to do individual work on a special project under the guidance of a member of the staff of the Department. These projects may include work in various areas of public health practice, such as medical care, mental health, cancer control, etc.

Public Health Practice 20. Research

Doctoral candidates are offered the opportunity to undertake individual study and research as the basis for a doctoral thesis.

Public Health Practice 30e. Field Work

Special assignments, January 27–February 1, 1964.

Credit 1 unit.

A week of supervised field observation may be arranged between the second and third periods of the School calendar. These opportunities may include assignments to federal, state, and local government and private health organizations, to selected research projects pertinent to the student's training, and to community projects involving program planning and evaluation for a complex of health and health-related organizations.

Public Health Practice 41a,b. Economics and Administration of Medical Care

Seminars. *Tuesdays, 2–4, first and second periods.* Dr. HAMLIN, Dr. PENCHANSKY, Professor DUNLOP, Professor LIVERNASH, and Dr. PETERSON.

Credit 2 units.

An interdisciplinary survey seminar of major issues in the economics and administration of personal health services which is designed for graduate students from the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics. The seminar is under the direction of the Interfaculty Committee on Health and Medical Care, composed of representatives from the participating schools, and is held at the Littauer Center for Public Administration.

The seminar deals with problems and patterns of adapting resources, organization, and payment for health personnel and facilities to the needs and demands for personal health services. It explores such major issues and problems in the administration and economics of medical care as the character of illness and patients, the organization of medical education and medical practice, changing requirements for health manpower and health facilities, patterns of organization of personal health services, standards of medical care and adequacy of services, government and private policies on providing and financing personal health services, and factors affecting utilization, efficiency,

and cost of various components of medical care, both in the United States and in other countries.

Special reading materials on medical care, selected and prepared by the seminar staff, serve as the basis for seminar discussion and analysis.

Permission of Dr. Hamlin is required for enrollment in this course.

Public Health Practice 41c,d. Case Study Analysis of Economic and Administrative Problems in Medical Care

Seminars. *Tuesdays, 3:30–5:30, third and fourth periods.* Dr. Hamlin, Dr. Penchansky, Professor Dunlop, Professor Livernash, and Dr. Peterson.

Credit 2 units.

An advanced interdisciplinary seminar for graduate students from the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics, which emphasizes analysis, planning, and decision-making in actual medical care situations through the use of case studies and supplemental materials prepared by the seminar staff and consultants. The seminar is under the direction of the Interfaculty Committee on Health and Medical Care, composed of representatives from the participating schools.

The case studies include analyses of selected government health services in the United States and other countries, proposals to finance health care for the aged, control of drug costs in hospitals and public welfare programs, union health and welfare programs, hospital manpower problems, and organization and quality of medical practice.

Public Health Practice 41a,b or permission of Dr. Hamlin is required. Special arrangements permit students to take both this seminar and Biostatistics 2c,d.

Public Health Practice 42c,d. Research Methods in Medical Care

Seminars. *Wednesdays, 3:30–5:30, third and fourth periods.* Dr. Penchansky.

Credit 2 units.

The seminar is designed mainly for master's and doctoral degree candidates specializing in medical care from the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics.

The purpose of the seminar is to develop research skills through analysis in depth of a limited number of significant medical care problems involving utilization, cost, efficiency, and quality of personal health services. The seminar will focus on defining problems for research, analyzing research designs which have been used by various investigators, and constructing re-

search designs suitable for further investigation. The topics for discussion will be selected to give participants facility with a variety of research methods used in analyzing medical care as well as substantive information on medical care.

Public Health Practice 41a,b or the permission of the instructor is required.

DEPARTMENT OF TROPICAL PUBLIC HEALTH

Thomas H. Weller, a.b., s.m., m.d., ll.d., *Richard Pearson Strong Professor of Tropical Public Health* and *Head of the Department*

Franklin A. Neva, s.b., m.d., *Associate Professor of Tropical Public Health*

Eli Chernin, s.b., a.m., s.d., *Associate Professor of Tropical Public Health*

Charlotte C. Campbell, s.b., *Associate Professor of Medical Mycology*

Thomas E. Frothingham, m.d., *Assistant Professor of Tropical Public Health*

Chia-tung Pan, b.sc., m.d., m.p.h., *Assistant Professor of Tropical Public Health*

Edward H. Michelson, s.b., s.m., ph.d., *Assistant Professor of Tropical Public Health*

Paul F. Russell, a.b., m.d., m.p.h., s.d. (hon.), *Visiting Lecturer on Tropical Public Health*

Fred L. Soper, a.b., s.m., m.d., dr.p.h., s.d. (hon.), *Visiting Lecturer on Tropical Public Health*

George M. Saunders, a.b., m.d., *Visiting Lecturer on Tropical Public Health*

Samuel W. Simmons, s.b., a.m., ph.d., *Visiting Lecturer on Tropical Public Health*

G. Robert Coatney, a.b., a.m., ph.d., s.d. (hon.), *Visiting Lecturer on Tropical Public Health*

Harry Most, s.b., m.d., d.t.m.&h., d.m.s., *Visiting Lecturer on Tropical Public Health*

Richard H. Daggy, s.b., s.m., ph.d., m.p.h., dr.p.h., *Visiting Lecturer on Tropical Public Health*

Andrew Spielman, s.b., s.d., *Associate in Tropical Public Health*

Charles A. Alford, s.b., m.d., *Research Fellow in Tropical Public Health*

Joseph W. Burnett, a.b., m.d., *Research Fellow in Tropical Public Health*

F. Xavier Pi-Sunyer, a.b., m.d., m.p.h., *Research Fellow in Tropical Public Health*

GUSTAVE J. DAMMIN, A.B., M.D., A.M. (hon.), *Elsie T. Friedman Professor of Pathology, Harvard Medical School and Peter Bent Brigham Hospital*

FRANZ C. VON LICHTENBERG, M.D., DR. (hon.), *Assistant Professor of Pathology, Harvard Medical School* and *Senior Associate in Pathology, Peter Bent Brigham Hospital*

The health problems of the tropical regions are, for the most part, those of the poorly sanitated areas of the world at large. In such areas the communicable and nutritional diseases are of primary import. The teaching and research interests of the Department of Tropical Public Health deal with the former category — the communicable diseases. Emphasis is given to disease entities that occur in the more developed areas of the world, and to a much smaller group of diseases that are tropical in an obligatory sense for climatic or other reasons. In the presentation of factual material, equal emphasis is given to ecological and epidemiological factors, to new knowledge concerning pathogenesis and diagnosis, and to prevention and control.

The basic course, Microbiology-Tropical Public Health 1a,b,c is designed to provide the Master of Public Health candidate with an integrated presentation of information on communicable diseases of major public health importance. Tropical Public Health 2a,b is designed for the Master of Public Health candidate concentrating in the field of Tropical Public Health. Attention is directed to Tropical Public Health 3d, open to all students, which deals with environmental and cultural factors influencing the development of health programs in tropical areas. With the exception of Tropical Public Health 3d, admission to the basic courses is contingent upon an adequate background in the pre-clinical medical sciences, especially pathology.

The investigative program in the Department is broad and currently deals with pathogens ranging from viruses to helminths. Thus, studies on the *in vitro* cultivation and the physiology and immunology of a wide variety of agents are in progress. Biological investigations on the molluscan vectors of the schistosomes comprise another area of major interest. Facilities are available for the training of a limited number of students at the Doctor of Public Health or Doctor of Science in Hygiene level, who may wish to spend a minimum of two years with emphasis on a program of original research. Due to time limitations, the Doctor of Science in Hygiene applicant should, in so far as possible, obtain the necessary medical science background prior to enrollment.

A program supported by the National Institutes of Health is available to assist qualified applicants who desire training in medical parasitology, (see page 105) and a similar program is available to provide training in tropical medicine. Collaborative arrangements established with institutions in the tropics provide diversified opportunities for study and research overseas.

Microbiology and Tropical Public Health 1a,b,c. Ecology and Epidemiology of Infectious Diseases

Lectures, seminars, conferences and laboratory exercises. *Tuesdays and Thursdays, 10:30–11:30, Wednesdays, 9:30–10:30, Thursdays, 1:30–4:30, first period; Tuesdays, 10:30–11:30, Wednesdays, 9:30–10:30, Thursdays, 11:30–12:30 and 1:30–4:30, second period; Tuesdays and Thursdays, 10:30–12:30, Wednesdays, 9:30–10:30, third period.* Dr. SNYDER, Dr. WELLER and the Staff of the two Departments.

Credit 6 units.

One of the six semi-elective courses from which Master of Public Health candidates are required to elect a minimum of 12.5 credit units.

This course is under the general direction of Drs. Snyder and Weller, with the collaboration of the staff of the Departments of Microbiology, Tropical Public Health and Epidemiology. The purpose of the course is to provide students in the Master of Public Health program with the basic knowledge of the communicable and infectious diseases, including the relevant ecologic factors which pertain directly to their prevention and control.

Microbiology and Tropical Public Health 1a,b,c is designed for students who have had most of the courses given in the first two years of medical school or their equivalent. The exercises include discussions of the present status of infectious diseases in tropical and temperate climates and the technics available for study of microorganisms and parasites, with special reference to recent methods which have opened a new era in microbiology. The course emphasizes the principal diseases of public health importance. The subjects are presented by etiologic agent, including protozoa, helminths, viruses, rickettsiae, spirochetes and bacteria.

Approximately two-thirds of the time will be devoted to lectures and one-third to conferences, seminar discussions, and laboratory exercises. In the laboratory the student is expected to acquire an understanding of the potentialities as well as the limitations of pertinent public health laboratory procedures.

Tropical Public Health 2a,b. Ecology and Prevention of Tropical Diseases

Seminars, laboratory exercises, assigned reading. *Wednesdays, 1:30–3:30, first and second periods.* Dr. NEVA, Dr. CHERNIN and Dr. FROTHINGHAM.

Credit 2 units.

This course is designed for students concentrating in the Department of Tropical Public Health. It is planned to supplement Microbiology-Tropical Public Health 1a,b,c, and deals with important disease entities omitted from the basic course because of time limitations. Emphasis is placed on the eco-

logical and epidemiological approach to the multiplicity of interrelated factors governing the welfare of man in tropical and poorly sanitated areas.

Tropical Public Health 3d. Problems in Tropical Health

Lectures and conferences. *Fridays, 10:30–12:30, fourth period.* Dr. WELLER and guest lecturers.

Credit 1 unit.

This course is designed to provide general background information on environmental, social, economic, and political factors influencing the development of health programs in the tropics. At each session a distinguished guest lecturer covers an assigned topic; the subject material includes such diversified topics as the status of professional education in tropical areas, the importance of the zoonoses, and political policies in the field of international cooperation. Each formal presentation is followed by a period devoted to informal student discussion. Registration is open to all students.

Tropical Public Health 5c,d. Seminar

Seminars and discussions. One hour session twice a month throughout the third and fourth periods. Time to be arranged. Staff of the Department.

Credit .5 unit.

Students particularly interested in tropical health will meet with staff members for the presentation and discussion of current literature and original investigations. Admission for credit is subject to the approval of the Head of the Department, and the total number of students is limited.

Tropical Public Health 6c. Parasitic Infections of Man

Lectures, laboratory exercises and demonstrations. *Twelve afternoons, Mondays, Wednesdays, and Fridays, 2–5, January and February.* Dr. WELLER, Dr. NEVA, Dr. CHERNIN, Dr. FROTHINGHAM and associates.

Credit 1.5 units.

This course is designed primarily for students in the School of Medicine. It is open, however, to a limited number of students registered in the School of Public Health. The important helminth and protozoan parasites of man are considered with reference to their geographic distribution, identification, mode of transmission, pathogenesis, immune reactions, and methods for prevention and control. Clinical aspects and chemotherapy of parasitic diseases are discussed. Emphasis is given to methods of laboratory diagnosis. Arthropods of parasitologic importance are briefly surveyed.

Tropical Public Health 7c. Laboratory Technics

Conferences and laboratory. *Tuesdays and Thursdays, 2:30–5:30, third period.* Dr. PAN.

Credit 2 units.

Students are offered the opportunity to learn principles and technics essential for the study of animal parasites of medical and public health importance. The course consists of lectures and laboratory work under tutorial supervision. Emphasis is placed on *in vitro* and *in vivo* cultivation of parasites, their identification, and the investigation of their biological properties. The course is designed to prepare those who will be involved in laboratory research or in field studies in the area of medical parasitology.

Enrollment limited and subject to the approval of the instructor.

Tropical Public Health 8d. Introduction to Molluscs of Public Health Importance

Conferences, laboratory and field exercises. *Tuesdays, 2:30–5:30, fourth period.* Dr. MICHELSON.

Credit 1 unit.

This is an introductory course designed to acquaint the student with the molluscs which may act either as active or passive agents for the dispersal of pathogens, toxins, or parasites which cause disease in man. Students will be offered the opportunity to study field and laboratory technics necessary for an understanding of the taxonomy, morphology, cultivation, ecology and control of these molluscs.

Prerequisite: Consent of instructor.

Tropical Public Health 9d. Introduction to Medical Entomology

Conferences, laboratory, and field exercises. *Thursdays, 2:30–5:30, fourth period.* Dr. SPIELMAN.

Credit 1 unit.

This course deals with the insects, ticks and mites of medical importance. Their recognition, biology, and role in the production of disease are considered. Techniques of identification, collection, rearing and handling will be demonstrated and insect anatomy and physiology briefly reviewed.

Prerequisite: Consent of instructor.

Tropical Public Health 17a,b,c,d,e. Introduction to Laboratory Research

Laboratory exercises. Time and credit to be arranged.

Individual work for candidates at the Master's degree level may be carried out under supervision of a member of the Department. A variety of parasites

of medical importance are maintained and are available for studies on metabolism, host-parasite relationships, and chemotherapy. Arrangements are subject to the approval of the instructor.

Tropical Public Health 20. Research

Doctoral candidates or qualified full-time special students may undertake original investigations in the laboratory or in the field by arrangement with the Head of the Department.

Tropical Public Health 44b. Clinical and Pathologic Features of Tropical Diseases

Case presentations, clinico-pathologic conferences, and demonstrations. *Tuesdays, 1:30–3:30, second period.* Dr. Neva, Dr. von Lichtenberg and staff members.

Credit 1 unit.

This course, designed for students particularly interested in tropical medicine, supplements material presented in Microbiology-Tropical Public Health 1a,b,c. The emphasis is on the clinico-pathologic aspects of tropical diseases. At each session one or more disease entities are introduced by presentation of a clinical case, and pertinent clinical and pathological features of the disease then reviewed. Enrollment subject to approval of the instructor.

Prerequisite: Tropical Public Health 6c or equivalent, or enrollment in Microbiology-Tropical Public Health 1a,b,c.

Section IV
Special Programs

An analysis of the positions occupied by the alumni of the Harvard School of Public Health has shown that they are engaged in a wide range of activities in public health, engineering and medicine. It is of particular importance to the School, however, that approximately 20 per cent of its graduates have entered careers in education and research. Thus the curriculum must provide students with the basis for effective participation in the academic as well as the administrative aspects of public health. A course of study leading to a doctoral degree is the traditional way to prepare for an academic career. The alternative, for those who have completed their professional education, is to spend enough time as a research fellow to learn the technics of investigation and to acquire thorough knowledge of a particular field. The Harvard School of Public Health encourages both types of activity, and is seeking to improve its curriculum for advanced students and the opportunities for research fellows.

In pursuing these objectives the Faculty has, from time to time, undertaken new plans of instruction when it is clear that the School has both the opportunity and the ability to meet a need in one of the major areas of public health. The experience gained determines whether the particular undertaking can be incorporated into the general academic activity of the School. An example is the special program for teachers of preventive medicine and public health which was begun in 1956 and which has been integrated with the regular academic activities of the School, as described below.

Preventive Medicine and Public Health. In recognition of the need for well trained teachers of preventive medicine and of public health, the School plans to intensify its long term efforts to attract students whose field of endeavor is, or is likely to be, in departments of preventive medicine and public health in this country or abroad. The experience of the past six years has indicated that each candidate for an academic career in preventive medicine and public health should be encouraged to select either a research fellowship or that

particular degree program of the School which is best suited to his individual needs and his own professional background. The regular academic programs of the School are sufficiently flexible to meet the varied needs of individual students seeking preparation for academic careers.

Regardless of their degree status, these students will be encouraged to acquire a high level of competence in one of the public health disciplines, this being regarded as most important for success in an academic career. Special seminars and short periods of observation at representative institutions will be included in the schedules offered by the School. When it is advantageous to a particular student, the School will seek to coordinate his course of study with residency training programs, such as those which may be recommended by the American Board of Preventive Medicine or which may be developed in other countries.

Programs Related to Mental Health and Mental Disorder

Problems of mental health and mental disorder are of concern to several departments of the School, particularly Epidemiology, Maternal and Child Health, and Public Health Practice. By developing opportunities for study and research in several aspects of the broad field of mental health, the School hopes to encourage the enrollment of students or the application of research fellows who are interested in mental health and who are qualified to undertake advanced studies in preparation for careers in teaching, research, and administration. For those who enroll as students, the programs in mental health are arranged within the framework of the various degrees offered by the School (see pages 27–36).

In the Department of Epidemiology, students and research fellows may undertake a program of study and research in the application of epidemiologic methods to mental disorders. The plan of work is arranged on an individual basis in consultation with the head of the Department.

In the Department of Maternal and Child Health, students may

participate in the community studies concerned with the significance of mental disorders in pregnancy and childhood.

In the Department of Public Health Practice, a program in community mental health is available to candidates who may come from the disciplines of psychiatry, psychology, social work, or public health nursing if they are qualified for graduate study in community mental health. After completion of the academic year students are encouraged to spend two months or more in supervised field activities which provide experience in mental health administration. Individual programs are planned for advanced students by the Director of the Community Mental Health Unit in consultation with the Head of the Department of Public Health Practice.

Programs of Study in the Division of Environmental Health Sciences and Engineering

The combination of medical, engineering, and related disciplines in the Division of Environmental Health Sciences and Engineering enables the School to offer programs of instruction in special fields such as occupational medicine, aviation health and safety, radiological health, and community air pollution control. The Division includes the Departments of Industrial Hygiene, Sanitary Engineering and Physiology. The University Health Services' Division of Environmental Health and Safety is closely related and provides opportunities for practical experience in environmental health activities within the University.

Occupational Medicine

Physicians may enroll in this program through any one of the Masters degrees offered by the School. Qualified students may be accepted for a second year of work toward a doctoral degree in one of the fields of occupational medicine or environmental health. Other students may elect to remain for a second year of formal courses and tutorial study in occupational medicine and public health.

The usual course content of the program is listed under the Master

of Industrial Health degree (page 30). Additional courses and course content may be found under the department listings.

Aviation Health and Safety

Students may undertake an academic program in Aviation Health and Safety as candidates for one of the various degrees offered by the School (see pages 27–36).

Weekly seminars given throughout the year are designed to meet the special interests of those concentrating in the field of aviation medicine, not only for representatives of the military services, but also for those who plan to enter the medical or engineering departments of aircraft manufacturing companies and civil airlines.

Industrial Hygiene and Industrial Hygiene Engineering

Since 1951 the U.S. Atomic Energy Commission has awarded fellowships to graduate students in engineering, chemistry, physics and biology for studies in industrial hygiene and industrial hygiene engineering. Students may be admitted to a two-year program leading to a Master of Science in Hygiene degree. Students having an acceptable year of graduate work elsewhere may be admitted to the program on a one-year basis.

Radiological or Health Physics and Radiation Control Programs

Programs in radiological hygiene and radiation control are offered by the School of Public Health to graduate students only. Properly qualified students including U.S. Atomic Energy Commission Fellows may be admitted to a one- or two-year program depending upon whether they have had an acceptable year of graduate work elsewhere. This program leads to a Master of Science in Hygiene degree. A program of courses in radiological hygiene, atomic and nuclear physics, radiological engineering, industrial hygiene, physiology, toxicology, radiation biology and related subjects is planned on the basis of individual backgrounds and needs.

Program in Public Health Education

This program is offered by the School of Public Health with the cooperation of the Department of Social Relations (Faculty of Arts and Sciences) and the School of Education. The program is flexible and will be modified to suit the needs of the student. Class work is supplemented by special projects integrated with the seminars on program planning, research, and evaluation as well as by three months of supervised field training following the spring term.

Candidates may study for the degree of Master of Science in Hygiene. Work toward the degree of Doctor of Science in Hygiene is offered to exceptional students.

Health education is an area of public health practice in which there has been rapid development in recent years. Professional opportunities are numerous and varied and exist at local, state, national, and international levels in all types of government and private agencies.

Program in the Economics and Administration of Medical Care

This Program, a part of the Department of Public Health Practice, is affiliated with the Interfaculty Program on Health and Medical Care involving the Schools of Public Health, Medicine, Business Administration, and Public Administration, and the Department of Economics of Harvard University. The Program offers training and research on problems in the provision of medical care services, and stresses the study and analysis of varying patterns of personal health services in the United States and other countries.

Students in the Interfaculty Program are from various schools and departments within Harvard University, and are enrolled as master and doctoral degree candidates in their own schools and departments while taking the Program's basic courses. The objective with students enrolled in the School of Public Health is to train them in analysis and decision-making and to give them an appreciation of the application of the administrative and social sciences in

administering medical care programs. For students from other than the School of Public Health, the Program's objective is to give an adequate foundation in medical care to allow for the intelligent application of their own specialities to the medical care scene.

The role and techniques of research in medical care are stressed and the Program's research studies provide opportunities for exceptional students to undertake doctoral work and to gain substantial research experience.

Section V
General Information

GENERAL INFORMATION

Registration

Registration in the School of Public Health for the academic year 1963–64 takes place from Monday, September 16 to Friday, September 20. In order to allow ample time for planning of individual course programs and for discussions with Faculty members, students enrolling for the first time are expected to start the registration procedures on Monday of registration week.

Foreign Students

An orientation course for students coming to the United States for the first time will be held at the School of Public Health from Monday, September 9 to Friday, September 20, 1963. The program is planned to acquaint the students with our customs and teaching methods, with library and other facilities available. It will include lectures and seminars, visits to various University departments and to hospitals or public health activities in Boston.

During this period each student who comes from outside the United States will have a conference with the Faculty Advisor for Foreign Students to discuss his particular needs and interests. This Advisor, as well as the staff of the Dean's Office, is available for consultation with students throughout the year.

All students who are not citizens of the United States will be referred during the orientation period to the Harvard International Office, Holyoke Center, 75 Mt. Auburn Street, Cambridge, where they will show their passports, and fill out a Student Registration form.

Fees and Expenses

Effective with the academic year 1963–64 the tuition fee is $1,520 for all first-year full-time students and for candidates for the degree

of Master of Science in Hygiene who are in the second year of a two-year program. The fee includes the Health Service Fee for medical care and insurance for all resident students. Each candidate for a degree must have a minimum of one year of residence at the School at full tuition. Doctoral degree candidates who are enrolled for less than full time pay tuition at reduced rates, as shown in the following schedule:

First Year	
Half-time students	$820 per year
Second Year	
Full-time resident doctoral candidates	$820 per year
Half-time resident doctoral candidates	470 per year
Non-resident doctoral candidates	250 per year
Other half-time resident students	820 per year
After the second year	
Resident doctoral candidates	$320 per year
Part-time Special students, enrolled for less than half-time	
First credit unit of course work per term	$80
Each additional unit per term up to 10 units	$35

Payment of Fees

Bills for tuition and fees will be issued and payable as follows:

Issued	*Payable*	
At registration	Within 10 days	¼ Tuition
Nov. 30	Dec. 15	¼ Tuition Board through October 31 Miscellaneous Charges
Jan. 30	Feb. 15	¼ Tuition Board through December 31 Miscellaneous Charges

April 30	May 15	¼ Tuition Board through March 31 Miscellaneous Charges
June 3*	June 10	Board to the end of the year Miscellaneous Charges
June 30	July 15	Board to the end of the year Miscellaneous Charges

Students who are candidates for degrees must have paid all dues to the University at least one day before the day upon which the degrees are to be voted. A student who leaves during the year is charged to the end of the tuition period in which he leaves provided before that time he gives the Dean notice in writing of his withdrawal; otherwise he is charged to the end of the tuition period in which such notice is given.

A student who leaves the University for any reason whatever must pay all charges against him immediately upon receipt of a bill from the Comptroller's Office. Every student will be held responsible for the payment of fees until he has notified the Dean of his intention to withdraw from the School.

All term bills will be sent to the student at his local address unless the Comptroller's Office is requested in writing to send them elsewhere.

Any student whose indebtedness to the University remains unpaid on the date fixed for payment is deprived of the privileges of the University. Reinstatement is obtained only by consent of the Dean of the School in which the student is enrolled after payment of all indebtedness and a reinstatement fee of $10. In addition as a condition of reinstatement such student is required to file with the Comptroller a bond in the amount of $1000 as security for the payment of future term bills.

Student Health Service

Under the University Health and Insurance Plan students at the School receive medical care and insurance toward hospital expenses.

* Applies only to candidates for degrees.

Medical care is provided through the facilities of the Medical Area Health Service, located in the Peter Bent Brigham Hospital. The hospital insurance extends for a period of twelve months from September 1 and covers hospitalization both in Boston and elsewhere. Research Fellows in training status may enroll in the Student Plan.

Dependents of students may be included in the hospital insurance part of the plan, if the student so elects; the rates are $40 for wives or husbands and $26 for one or more children, for twelve months. Students are advised to avail themselves of this option.

Every new student is required to undergo a medical examination, by appointment, shortly after admission to the School.

Evidence of successful vaccination against smallpox within three years is required for entrance to Harvard University and a certification form for this purpose is sent to each student who is accepted for admission.

Any illness necessitating absence from classes should be reported to the Student Health Service Office by the student, or an attending physician, and to the Registrar's Office at the School.

In order to realize maximum benefit from the opportunities provided by the academic program of the School, students must be in excellent physical and mental health. Prospective students are urged to undergo a thorough examination to satisfy themselves of their fitness before making arrangements to enter the School.

Housing

The Henry Lee Shattuck International House of the School of Public Health was opened in the fall of 1960 as a residence for its graduate students and their families. The Shattuck International House includes three remodelled apartment houses, at 199, 203 and 207 Park Drive, Boston, within walking distance of the School. There are 63 apartments on four floors, including units with one to four rooms, plus kitchenette, bath and foyer. Essential furniture and kitchen equipment are provided. Laundry facilities and a play area for children are located on the ground floor of building 207, and

social and recreational facilities for the common use of residents are available on the ground floor of buildings 199 and 203. Students who wish to inquire about an apartment in the Shattuck International House should write to Mrs. Margaret D. Penrose, Harvard School of Public Health, 55 Shattuck Street, Boston.

Furnished rooms for single students are available in the vicinity of the School, or in nearby residential areas such as Brookline. Students who wish help in finding a room or a house should write to the Registrar, Harvard School of Public Health, 55 Shattuck Street, Boston, after they receive notice of admission to the School. Married students should indicate the size of their family, number of rooms desired and whether they wish furnished or unfurnished quarters.

Employment

Generally it is not advisable for a student to seek employment as a means of financing his training because the course of study at the School is an intensive, full-time program. If the wife of a student has secretarial or technical skills and wishes to obtain temporary employment, she may consult the Harvard Medical Center Personnel Office in Building A of the Medical School after getting settled in Boston. Wives of foreign students who wish to work in Boston must indicate this when obtaining their visas for the United States.

Fellowships and Traineeships

The fellowships and traineeships described below were available to students for the academic year 1962–63. It is expected that comparable awards will be available for 1964–65.

Applications for fellowships and traineeships should be made to: The Registrar, Harvard School of Public Health, 55 Shattuck Street, Boston 15, Massachusetts. Applications should be received by April 1, 1964 for awards for the academic year 1964–65. Under exceptional circumstances awards may be considered at other times.

Fellowships and Traineeships Awarded by the School

Fellowships and traineeships are available from grants to the School for students who are candidates for master's or doctor's degrees. They include a monthly stipend plus tuition. Applicants for awards from Public Health Service or Children's Bureau grants must be citizens of the United States or have filed a Declaration of Intent.

1. Public Health Service General Purpose Traineeship Grant (Title I) for physicians, dentists, veterinarians, nutritionists, medical social workers, health educators and others whose professional skills are required in modern public health practice.

2. Public Health Service Title II traineeships for public health nurses.

3. Traineeships from Public Health Service Training Grants to Departments of the School are available for study at the pre-doctoral or post-doctoral levels in the following fields:

Biostatistics.

Environmental Health (including radiological health and air pollution).

Industrial Hygiene.

Physiology.

Epidemiology; for candidates with degree of M.D. or Ph.D. or equivalent.

Microbiology; for candidates with degree of M.D. or Ph.D. who wish to specialize in the field of infectious disease, including rickettsial, viral, bacterial and mycological infections.

Nutrition.

Public Health Practice, Division of Community Mental Health; for psychiatrists, clinical psychologists and social workers who wish to specialize in the mental health aspects of public health.

Public Health Service Special Purpose Traineeship Grant for research training in medical care administration and in public health practice. Available for qualified candidates in the health professions and the social sciences at the post-master's or post-doctoral levels.

Tropical Public Health; for training in medical parasitology, in tropical medicine and in tropical public health.

4. Two fellowships provided by a grant from the Children's Bureau are available for students who intend to specialize in Maternal and Child Health.

5. Fellowships for one to three years in Community Mental Health have been made possible by a grant from the Grant Foundation of New York. The fellowships are intended for psychiatrists, clinical psychologists, and social workers who are studying at a level consistent with master's or doctor's degree candidacy.

Fellowships Awarded Outside the School

Fellowships are available in Industrial Medicine, Industrial Hygiene and Health Physics from the Atomic Energy Commission. Applicants for fellowships in Industrial Medicine (physicians only) should write to: A.E.C. Fellowships in Industrial Medicine, Atomic Energy Project, University of Rochester, School of Medicine and Dentistry, Rochester 20, New York. Applicants for fellowships in Industrial Hygiene and Health Physics should write to: Fellowship Office, Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tennessee.

Fellowships and Scholarships Available in other Departments of the University as well as in the School of Public Health

There are a few General University Scholarships and Fellowships which, under the terms of the original gift to the University, may be awarded to students in any part of the University, including the School of Public Health. Many of these are for persons from a particular city, state or country, for study of a particular field, or for those with other special qualifications. Applications for these scholarships must be received at the School of Public Health by February 1, 1964. A pamphlet describing these University Scholarships may be obtained from the Secretary of Admissions and Scholarships of the School of Public Health.

STUDENTS, 1962–63

Degree Candidates and Full-Time Special Students

Abelin, Theodor, M.D.	Berne, Switzerland
Abou Daoud, Kamal T., M.D., D.T.M.&H.	Beirut, Lebanon
Afzal, Mohammad M., B.SC., M.A.	Lahore, West Pakistan
Bantegui, Celia G., B.S.CH.E., M.A.	Quezon City, Philippines
Barrett, Harry G., S.B.	Philadelphia, Pennsylvania
Basu, Rabindra N., M.B.,B.S., D.P.H.	West Bengal, India
Bell, Eldon E., S.B., M.D.	Snohomish, Washington
Bellin, Lowell E., S.B., M.D.	Longmeadow, Massachusetts
Berggren, Dr. Warren L., M.D.	Aurora, Nebraska
Brain, Joseph D., A.B., S.M.	Wayne, New Jersey
Bullen, Beverly A., S.B., S.M., S.M. IN HYG.	Chattanooga, Tennessee
Buncher, Charles R., S.B.	Millburn, New Jersey
Carver, Cynthia L., A.B.	Boston, Massachusetts
Challenor, Bernard D., A.B., M.D.	Brooklyn, New York
Chapman, Calvin C., S.B., M.D.	San Antonio, Texas
Chen, Julia J., M.D.	Taipei, Taiwan
Cooper, Kenneth H., S.B., M.D., M.P.H.	Oklahoma City, Oklahoma
DeGeneres, Lanford H., S.B., M.D.	Shreveport, Louisiana
Dhillon, Harwant S., B.SC., M.SC.	West Bengal, India
Dresse, Francois H., M.D.	Liege, Belgium
Dryden, Stanley L., S.B.	Glendale, California
Duggar, Benjamin C., S.B., S.M. (in absentia)	St. Petersburg, Florida
Feinleib, Manning, A.B., M.D.	Brooklyn, New York
Fiala, Milan, M.D.	Boston, Massachusetts
Fry, Harold H., M.D.	Camden, Tennessee
Georgiadis, Theodore, B.SC.	Athens, Greece
Gibbons, Harry L., S.B., M.D.	Logan, Utah
Glass, Robert L., S.B., D.M.D., M.P.H.	Westwood, Massachusetts
Gravel, Gaston, B.A., M.D., D.P.H.	Montreal, Quebec, Canada
Halpin, Mary A., A.B., M.D.	Boston, Massachusetts
Hannon, Virginia R., A.B., A.M., M.S.S.W., S.M. IN HYG.	Atlanta, Georgia
Hansen, Robert G., D.D.S.	Colorado Springs, Colorado
Harfouche, Jamal K., B.A., M.D., S.M. IN HYG. (in absentia)	Beirut, Lebanon
Hark, William H., A.B., S.B., M.D.	Charleston, West Virginia

Harrison, Grover C., M.D.	Oklahoma City, Oklahoma
Hasler, Norman B., A.B., M.D.	Arlington, Massachusetts
Hassler, Ferdinand R., S.B., M.D.	Silver Spring, Maryland
Hayashida, Takuya, B.AGR., M.AGR.	Fukuoka, Japan
Haynes, M. Alfred, S.B., M.D.	South Burlington, Vermont
Heine, Earle R., A.B., M.D.	Circleville, Ohio
Highriter, Marion E., A.B., M.N., M.P.H.	Wilkes-Barre, Pennsylvania
Hoffman, Paul E., A.B., M.D.	North Collins, New York
Hosack, Alice M., S.B., A.M., S.M. IN HYG.	Sharon, Pennsylvania
Husain, Syed S., B.SC., M.A.	Karachi, Pakistan
Isaacs, Gertrude, S.B., M.P.H.	Boston, Massachusetts
Johnson, Louis F., Jr., S.B., M.D., M.P.H. (in absentia)	Washington, D.C.
Kessler, Irving I., A.B., A.M., M.D., M.P.H.	Boston, Massachusetts
Khan, Md. Aminur R., B.SC., M.SC.	Dacca, Pakistan
Kilby, Ralph A., A.B., M.D., S.M.	Lawrence, Kansas
Klevay, Leslie M., S.B., M.D., S.M. IN HYG.	Skokie, Illinois
Kuraishy, Mahmood-ul-Hassan, M.B.,B.S.	Bahawalpur, Pakistan
Levey, Samuel, A.B., A.M., A.M., PH.D.	Portland, Maine
Lieberman, Edwin J., A.B., M.D.	Brookline, Massachusetts
Lin, Hsiang-Ju, A.B., S.M. IN HYG. (in absentia)	Cannes, France
Littell, Delvin E., A.B., M.D.	Lebanon, Tennessee
Malhotra, Prabha, M.B.,B.S.	New Delhi, India
Martikainen, A. Helen, A.B., M.P.H., S.D. (hon.)	Laconia, New Hampshire
Martinez-Silva, Ramiro, M.D., M.D.	Santiago, Spain
Mason, James O., A.B., M.D.	Watertown, Massachusetts
Masse, Louis M. F., M.D., M.P.H. (in absentia)	Reims, Marne, France
Moore, Steven L., S.B., M.D.	Lucedale, Mississippi
Muzayyin, Muhammad K., M.D.	Damascus, Syria
Nichols, Robert S., A.B., PH.D.	Clifton, New Jersey
Nitzberg, David M., A.B., S.M.	Lexington, Massachusetts
O'Connor, Deirdre M., L.R.C.P.&S.I.	Oregon, Ohio
Oomen, Johannes M. V., M.D.	Utrecht, Holland
Pattanaik, Lilabati, M.B.,B.S.	Orissa, India
Peralta, Presentacion C., M.D., M.P.H.	Quezon City, Philippines
Pi-Sunyer, F. Xavier, A.B., M.D.	New York, New York
Plank, Stephen J., PH.B., A.B., M.D., M.P.H.	Carmel, California
Pollack, Earl S., S.B., A.M.	Silver Spring, Maryland
Reinherz, Helen Z, A.B., S.M., S.M. IN HYG.	Malden, Massachusetts
Reist, Parker C., S.B., S.M.	Pittsburgh, Pennsylvania

Riley, Leo H., Jr., A.B., M.D.	Newtonville, Massachusetts
Rosato, Donald J., M.D.	Devon, Pennsylvania
Sagheb, Saleh, M.D.	Tabriz, Iran
Salisbury, Arthur J., S.B., M.D.	Boston, Massachusetts
Sanne, Margarethe, M.D., M.P.H.	Hamburg, Germany
Schottenfeld, David, A.B., M.D.	Brooklyn, New York
Schulberg, Herbert C., A.B., A.M., PH.D.	Danbury, Connecticut
Schultz, Irwin, A.B., M.D., S.M. IN HYG. (in absentia)	Morton Grove, Illinois
Schwartz, John T., A.B., S.M., M.D.	Lehighton, Pennsylvania
Shayan, Kazem, M.D., D.P.H.	Teheran, Iran
Sheldon, Alan P., B.A., M.B.,B.CHIR., M.A.	London, England
Shleien, Bernard, PHARM.D.	Bronx, New York
Simmons, Alvin J. S.B., S.M., PH.D., S.M. IN HYG.	South Dartmouth, Massachusetts
Simmons, Henry E., S.B., M.D.	Lexington, Massachusetts
Sinha, Kameshwar S., B.A., M.A., PH.D.	Chapra, India
St.-Aubin, Paul M. G., M.D.	Boston, Massachusetts
Suzuki, Hideo, B.AGR.	Tokyo, Japan
Underhill, Dwight W., B.E.	Washington, D.C.
van der Hoff, Nicholaas M., LIC., M.D.	de Bilt, Holland
Veit, Robert W., S.B.	San Luis Obispo, California
Watkins, Elizabeth L., A.B., M.S.S.A., S.M. IN HYG.	Chevy Chase, Maryland
Weiss, Deborah H., A.B.	River Forest, Illinois
Ziskind, Alan, A.B., M.D.	Belmont, Massachusetts

Part-Time Special Students

Fried, Juan J., M.D.	Caracas, Venezuela
Jones, Thomas B., A.B., M.S.W., PH.D.	Rio Piedras, Puerto Rico
McCourt, William F., L.R.C.P.&S.I.	Boston, Massachusetts
Neumann, Alfred K., A.B., A.M. M.D., M.P.H.	Brookline, Massachusetts
Pitt, Elaine L., A.B., M.D.	Boston, Massachusetts
Thorne, Melvyn C., A.B., M.D.	San Francisco, California

DEGREES

On June 14, 1962, the following degrees were conferred:

Doctor of Science in Hygiene

Carl Lexington Erhardt, B.B.A. (*City Coll. of New York*) 1941, M.P.A. (*New York Univ.*) 1957, S.M. IN HYG. (*Harvard Univ.*) 1958.

Thesis: Pregnancy Losses in New York City 1960

Special Fields: Biostatistics and Epidemiology

Marvin Nelson Glasser, B.B.A. (*City Coll. of New York*) 1949, M.P.H. (*Univ. of Michigan*) 1952.

Thesis: Factors Related to the Survival of Children with Acute Lymphocytic Leukemia

Special Field: Biostatistics

Leonardo Mata Jimenez, LIC. IN MICRO. & CLIN. CHEM. (*Univ. of Costa Rica*) 1957, S.M. IN HYG. (*Harvard Univ.*) 1960.

Thesis: Agar Cell Culture Precipitation Test (ACCPT): A Method Permitting Direct Immunodiffusion of Viral Components from Infected Cell Cultures on Agar

Special Field: Tropical Public Health

Lloyd Barton Tepper, A.B. (*Dartmouth Coll.*) 1954, M.D. (*Harvard Univ.*) 1957, M.I.H. (*ibid.*) 1960.

Thesis: Evaluation of Renal Function Subsequent to Childhood Plumbism

Special Field: Occupational Medicine

Master of Public Health

James William Alley, A.B. (*Univ. of Buffalo*) 1955, M.D. (*State Univ. of New York*) 1959.

Jirair Hagop Arsenian, M.D. (*American Univ. of Beirut, Lebanon*) 1947.

Walter Charles Barnes, Jr., S.B. (*Univ. of Dayton*) 1953, M.D. (*Northwestern Univ.*) 1957.

Gerald Robert Bassett, A.B. (*Stanford Univ.*) 1952, M.D. (*ibid.*) 1959.

Gert Henry Brieger, A.B. (*Univ. of California, Berkeley*) 1953, M.D. (*Univ. of California, Los Angeles*) 1957.

Eugene Joseph Clarke, Jr., S.B. (*Univ. of Tennessee*) 1952, M.D. (*ibid.*) 1955.

Harold Nelson Colburn, M.D. (*Univ. of Manitoba, Canada*) 1951.

Torrence Junius Collier, Jr., S.B. (*Morehouse Coll.*) 1952, M.D. (*Meharry Medical Coll.*) 1956.

Kenneth Hardy Cooper, S.B. (*Univ. of Oklahoma*) 1953, M.D. (*ibid.*) 1956.
Ronald Elton Costin, A.B. (*Hardin-Simmons Univ.*) 1954, M.D. (*Univ. of Texas*) 1958.
Augusto Tito De Morais, M.D. (*Univ. of Lisbon, Portugal*) 1948, D.T.M.&H. (*Tropical Medicine Inst. of Lisbon, Portugal*) 1949.
Charles Richard Dorn, M.D.V. (*Ohio State Univ.*) 1957.
Paul William Dysinger, A.B. (*Southern Missionary Coll.*) 1951, M.D. (*Loma Linda Univ.*) 1955.
Anton Gregers Geser, M.D. (*Univ. of Copenhagen, Denmark*) 1949.
Ralph Morton Gofstein, S.B. (*Harvard Univ.*) 1943, M.D. (*Yale Univ.*) 1951.
Kelly Gentry Gregory, M.D. (*Univ. of Tennessee*) 1956.
Marshall Joseph Hanley, A.B. (*Columbia Univ.*) 1942, M.D. (*New York Univ.*) 1945.
Ralph Samuel Hoover, S.B. (*Univ. of Notre Dame*) 1953, M.D. (*State Univ. of Iowa*) 1957.
Chatra Vardhamaniah Jayakeerthy, M.B.,B.S. (*Univ. of Mysore, India*) 1953, D.P.H. (*Univ. of Calcutta, India*) 1957.
David Randolph Jones, S.B. (*Davidson Coll.*) 1954, M.D. (*Duke Univ.*) 1958.
Quitman Warde Jones, M.D. (*Univ. of Tennessee*) 1953.
Daniel Frederick Krank, S.B. (*Univ. of San Francisco*) 1956, M.D. (*Univ. of California, San Francisco*) 1960.
Robert Henry Lennox, B.Sc. (*McGill Univ., Canada*) 1939, M.D.C.M. (*ibid.*) 1943, D.T.M. (*ibid.*) 1946.
Tong Ming Lin, M.D. (*Nippon Medical Coll., Japan*) 1944, DR.MED.SC. (*ibid.*) 1959.
Rowland Lionel Mindlin, S.B. (*Harvard Univ.*) 1933, M.D. (*ibid.*) 1937.
Ali Asghar Minou, M.A. (*Univ. of Teheran, Iran*) 1943, M.D. (*ibid.*) 1945.
Kenneth Ely Monroe, A.B. (*Harvard Univ.*) 1947, M.D.C.M. (*McGill Univ., Canada*) 1951.
Sister Mary Thomas More, S.B. (*Fordham Univ.*) 1951, M.D. (*Marquette Univ.*) 1958.
Amorn Nondasuta, M.D., (*Univ. of Medical Sciences, Thailand*) 1952, M.P.H. (*ibid.*) 1956.
Sevinc Nejat Oral, M.D. (*Univ. of Istanbul, Turkey*) 1948.
Carlton John Peterson, A.B. (*Morningside Coll.*) 1953, M.D. (*State Univ. of Iowa*) 1957.
David Charles Poskanzer, A.B. (*Harvard Univ.*) 1950, M.D. (*ibid.*) 1954.
Bosko Postic, M.D. (*Univ. of Zagreb, Yugoslavia*) 1955.
Lawrence Michael Bijan Razavi, M.B.,B.S., L.R.C.P., M.R.C.S. (*Univ. of London, England*) 1960.
Marie Taher Shahidi, M.D. (*Mashed Univ., Iran*) 1958.
Consuelo Maria Sousa, S.B. (*Howard Univ.*) 1954, M.D. (*ibid.*) 1958.
Madras Chokkalingam Swaminathan, M.B.,B.S. (*Univ. of Madras, India*) 1951.

Yung Ching Tai, M.B. (*National Defense Medical Center, Taiwan*) 1941.
R. Widodo Talogo, M.D. (*Univ. of Indonesia*) 1957.
Jesse Washington Tapp, Jr., A.B. (*Stanford Univ.*) 1952, M.D. (*Univ. of Chicago*) 1955.
Paul Roger Torrens, M.D. (*Georgetown Univ.*) 1958.
Dalpatram Harilal Trivedi, M.B.,B.S. (*Univ. of Bombay, India*) 1945, D.P.H. (*Univ. of Calcutta, India*) 1956.
Gunvantlal Keshavlal Trivedi, M.B.,B.S. (*Gujarat Univ., India*) 1952, D.P.B. (*Univ. of Bombay, India*) 1954, D.P.H. (*Univ. of Calcutta, India*) 1955.
Ira Clarke Wallstrom, S.B. (*Univ. of Washington*) 1947, M.D. (*ibid.*) 1951.
John Emmett Ward, A.B. (*Kansas State Teachers Coll. Pittsburg*) 1952, M.D. (*Univ. of Kansas*) 1956.
Anthony John Zangara, A.B. (*Brown Univ.*) 1953, M.D. (*Tufts Univ.*) 1957.

Master of Industrial Health

Bengt Olov Mollstedt, M.D. (*Univ. of Gothenburg, Sweden*) 1959.

Master of Science in Hygiene

(in the field of Biostatistics)

Jane Ava Menken, A.B. (*Univ. of Pennsylvania*) 1960.
Mohammad Sharif Qureshi, B.S. (*Panjab Univ., Pakistan*) 1955, M.A. (*ibid.*) 1957, D.P.H. (*American Univ. of Beirut, Lebanon*) 1959.
K. Srinivasan, B.A. (*Univ. of Madras, India*) 1954, M.A. (*ibid.*) 1954.
Arnaldo Francisco Florentino Torrents, M.D. (*Univ. of Buenos Aires, Argentina*) 1951.

(in the fields of Biostatistics and Epidemiology)

William Allan Mahon, L.R.C.P. ED., L.R.C.S. ED., L.R.F.P.&S.GLAS. (*Royal Coll., Scotland*) 1952.

(in the field of Epidemiology)

Olivier Jeanneret, M.D. (*Univ. of Geneva, Switzerland*) 1951, D.P.H. (*Univ. of Montreal, Canada*) 1961.
Lucien Richard Karhausen, M.D. (*Univ. of Brussels, Belgium*) 1952.
Alvin Joseph Simmons, S.B. (*Boston Coll.*) 1952, S.M. (*Univ. of Massachusetts*) 1954, PH.D. (*ibid.*) 1960.
Howard Webster Stoudt, Jr., A.B. (*Harvard Univ.*) 1949, A.M. (*Univ. of Pennsylvania*) 1953, PH.D. (*ibid.*) 1959.

(in the field of Maternal and Child Health)

Tsung-Hsien Wu, M.D. (*National Taiwan Univ., Taiwan*) 1951, DR.MED.SC. (*Keio Univ., Japan*) 1961.

(*in the field of Nutrition*)

Kathleen May Broell, S.B. (*Univ. of California, Davis*) 1960.
Ruth Davila Fogleman, B.SC. (*Univ. of Puerto Rico*) 1945, S.M. (*Univ. of Tennessee*) 1948.
Leslie Michael Klevay, S.B. (*Univ. of Wisconsin*) 1956, M.D. (*ibid.*) 1960.

(*in the field of Physiology*)

Vedat Fahrettin Akay, M.D. (*Univ. of Istanbul, Turkey*) 1956, D.P.H. (*Ankara School of Public Health, Turkey*) 1959.

(*in the field of Public Health Practice*)

Kamalakar Trimbak Chitre, M.B.,B.S. (*Univ. of Bombay, India*) 1947, D.P.H. (*Univ. of Calcutta, India*) 1951.
Milton Simon Davis, A.B. (*Boston Univ.*) 1958, S.M. (*Purdue Univ.*) 1961, PH.D. (*ibid.*) 1962.
Cyrus Mayshark, A.B. (*Williams Coll.*) 1949, M.ED. (*Boston Univ.*) 1952, H.S.D. (*Indiana Univ.*) 1954.
Marie Justin McIntyre, S.B.ED. (*Syracuse Univ.*) 1950, S.M.ED. (*ibid.*) 1952.
Surjit Kaur Pannu, M.B.,B.S. (*Panjab Univ., Pakistan*) 1953.
Mildred Webb, A.B. (*Univ. of Missouri*) 1946, M.S.W. (*Univ. of Kansas*) 1952.

(*in the field of Public Health Practice, Community Mental Health*)

Sylvia Bermann Torrents, M.D. (*Univ. of Cordoba, Argentina*) 1947.
Bernard Louis Bloom, A.B. (*Ohio Univ.*) 1947, A.M. (*ibid.*) 1948, PH.D. (*Univ. of Connecticut*) 1952.
Marilyn Augusta Fettig, A.B. (*Emmanuel Coll.*) 1952, M.S.S. (*Smith Coll.*) 1957.
Helen Zarsky Reinherz, A.B. (*Wheaton Coll.*) 1944, S.M. (*Simmons Coll.*) 1946.
Phyllis Rolfe, A.B. (*Brooklyn Coll.*) 1948, M.S.S. (*Smith Coll.*) 1954.
Kirpal Singh, M.B.,B.S. (*Madras Univ., India*) 1941, D.P.M. (*Univ. of London, England*) 1951.

(*in the field of Radiological Hygiene*)

Bessie Ruth Foster, S.B. (*Grambling Coll.*) 1956, S.M. (*Oregon State Univ.*) 1961.
Robert Harold Neill, M.E. (*Stevens Inst. of Technology*) 1951.

On March 4, 1963, the following degrees were conferred:

DOCTOR OF SCIENCE IN HYGIENE

Farouk Farid Faragalla, B.V.SC. (*Cairo Univ., Egypt*) 1950, M.D.V. (*ibid.*) 1954, S.M. IN HYG. (*Harvard Univ.*) 1960.

Thesis: The Effect of Nutritional Factors on the Excretion and Urinary Tract Deposition of Endogenous Oxalate in Experimental Animals

Special Field: Nutrition

Serene Lochaya, B.SC. (*Chulalongkorn Univ.*) 1956, M.SC. (*Univ. of Wisconsin*) 1958, S.M. IN HYG. (*Harvard Univ.*) 1959.

Thesis: The Metabolism of Adipose Tissue in Experimental Obesities

Special Field: Nutrition

Robert Edward Yoder, S.B. (*Appalachian State Teachers Coll.*) 1951.

Thesis: Dynamic Aerosol Agglomeration

Special Field: Radiological Hygiene

MASTER OF SCIENCE IN HYGIENE

(*in the field of Environmental Health*)

Dwight Wingate Underhill, B.E. (*Yale Univ.*) 1958.

FALL TERM — FIRST PERIOD (September 23 to November 16, 1963)

		Credit Units	
Interdepartmental Course			
1a	The Human Community **	2.5	
2a,b,c,d	Biostatistics and Epidemiology ***	1.75	(7) †
Environmental Health			
2a,b	Radiological Hygiene	2	(4)
3a,b	Occupational Medical Clinics	.5	(1)
5a,b	Aviation Health and Safety	1	(2)
15a,b	Divisional Seminar on Health-Related Aspects of Water Resource Management	1	(2)
Biostatistics			
1a,b	Principles of Biostatistics *	1.75	(3.5)
15a,b	Departmental Seminar	1	(2)
Demography and Human Ecology			
40a,b	Introduction to Ecology and Demography	1	(2)
Epidemiology			
1a,b	Principles of Epidemiology *	1	(2.5)
15a,b	Departmental Seminar	1	(2)
Industrial Hygiene			
2a,b	Industrial Air Analysis	2	(4)
6a,b	Industrial Ventilation and Air Conditioning	2	(4)
Maternal and Child Health		*Credit Units*	
15a,b	Departmental Seminar	1	(2)
Microbiology			
1a,b,c	Ecology and Epidemiology of Infectious Diseases **	2	(6)
15a,b	Seminar in Microbiology	1	(2)
Nutrition			
1a,b	Public Health Nutrition **	1.5	(2.5)
Physiology			
1a,b	Human Physiology	1.5	(3)
Public Health Practice			
1a,b	Public Health Administration I *	1	(3)
15a,b	Departmental Seminar	1–2	(2–4)
41a,b	Economics and Administration of Medical Care	1	(2)
Tropical Public Health			
1a,b,c	Ecology and Epidemiology of Infectious Diseases ** (see listing under Microbiology)		
2a,b	Ecology and Prevention of Tropical Diseases	1	(2)

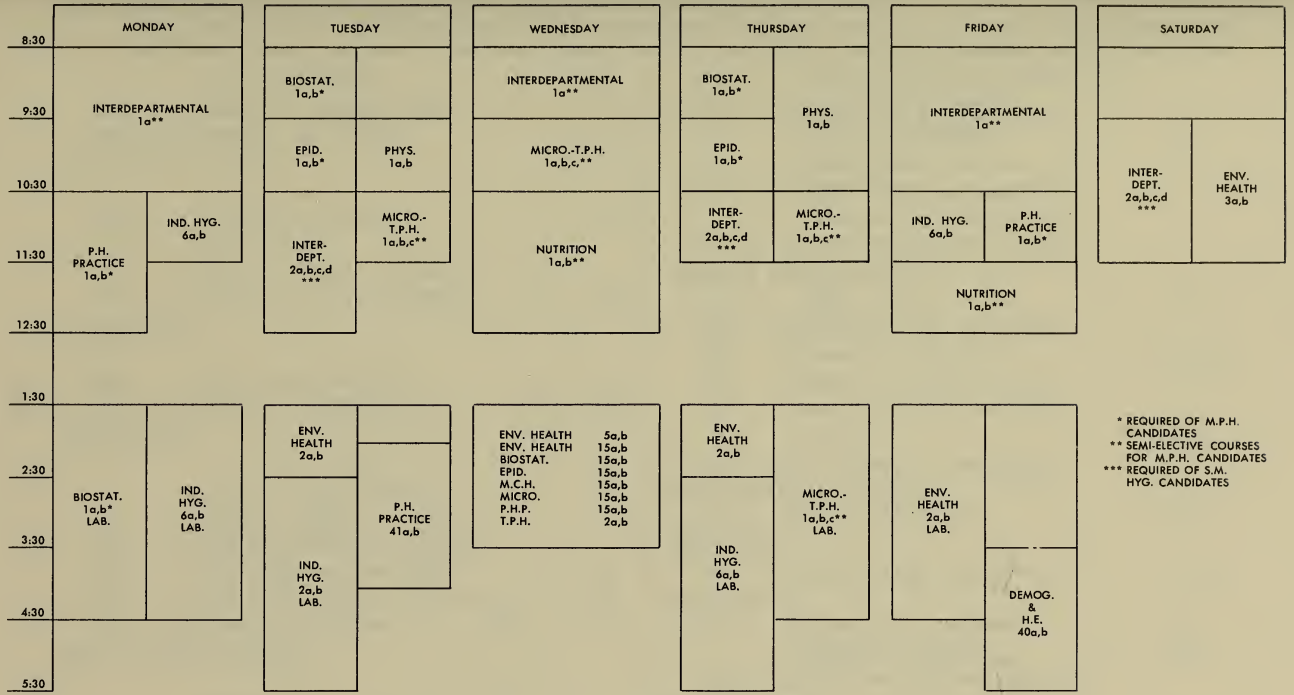
Unscheduled courses: Interdept. Course 42a,b; Biostat. 17a,b; Demog. & H.E. 17a,b; Epidemiology 17a,b; Industrial Hygiene 17a,b; Microbiology 17a,b; Nutrition 17a,b; Physiology 17a,b; Public Health Practice 17a,b; Tropical Public Health 17a,b. (See Department for description)

* Required of M.P.H. candidates ** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period

FALL TERM — FIRST PERIOD

September 23, 1963 to November 16, 1963



* REQUIRED OF M.P.H. CANDIDATES

** SEMI-ELECTIVE COURSES FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M. HYG. CANDIDATES

		Credit Units	
Interdepartmental Course			
2a,b,c,d	Biostatistics and Epidemiology ***	1.75	(7) †
3b	History and Philosophy of Public Health	1	
Environmental Health			
2a,b	Radiological Hygiene	2	(4)
3a,b	Occupational Medical Clinics	.5	(1)
5a,b	Aviation Health and Safety	1	(2)
15a,b	Divisional Seminar on Health-Related Aspects of Water Resource Management	1	(2)
Biostatistics			
1a,b	Principles of Biostatistics *	1.75	(3.5)
15a,b	Departmental Seminar	1	(2)
Epidemiology			
1a,b	Principles of Epidemiology *	1.5	(2.5)
3b	Clinical Problems in Infectious Disease	1	
15a,b	Departmental Seminar	1	(2)
Industrial Hygiene			
2a,b	Industrial Air Analysis	2	(4)
6a,b	Industrial Ventilation and Air Conditioning	2	(4)
Maternal and Child Health		*Credit Units*	
1b	Principles of Maternal and Child Health **	2	
15a,b	Departmental Seminar	1	(2)
Microbiology			
1a,b,c	Ecology and Epidemiology of Infectious Diseases **	2	(6)
15a,b	Seminar in Microbiology	1	(2)
Nutrition			
1a,b	Public Health Nutrition **	1	(2.5)
Physiology			
1a,b	Human Physiology	1.5	(3)
Public Health Practice			
1a,b	Public Health Administration I *	2	(3)
3b	Development of Personality	1	
4b,c	Control of Chronic Disease	1	(2)
15a,b	Departmental Seminar	1–2	(2–4)
41a,b	Economics and Administration of Medical Care	1	(2)
Tropical Public Health			
1a,b,c	Ecology and Epidemiology of Infectious Diseases ** (see listing under Microbiology)		
2a,b	Ecology and Prevention of Tropical Diseases	1	(2)
44b	Clinical and Pathologic Features of Tropical Diseases	1	

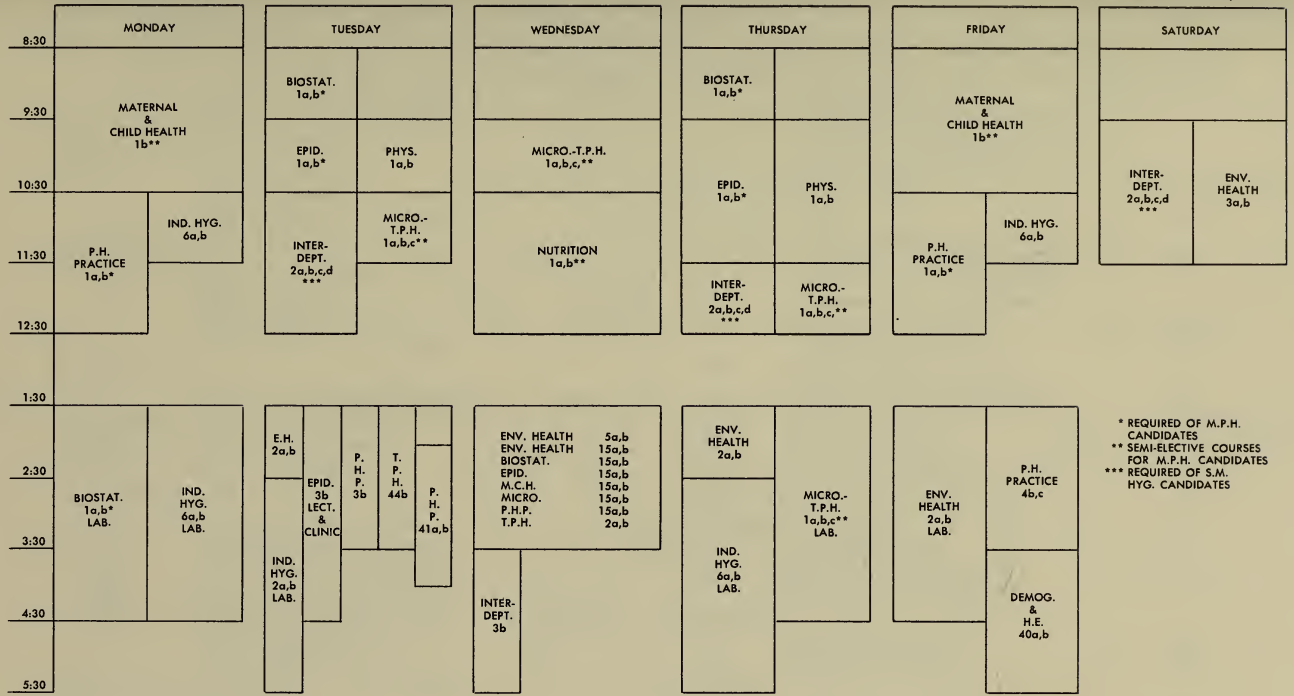
Unscheduled courses: Interdept. Course 42a,b; Biostat. 17a,b; Demog. & H.E. 17a,b; Epidemiology 17a,b; Industrial Hygiene 17a,b; Maternal and Child Health 17b,c,d; Microbiology 17a,b; Nutrition 17a,b; Physiology 17a,b; Public Health Practice 17a,b; Tropical Public Health 17a,b. (See Department for description)

* Required of M.P.H. candidates ** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period

FALL TERM — SECOND PERIOD

November 18, 1963 to January 25, 1964



* REQUIRED OF M.P.H. CANDIDATES

** SEMI-ELECTIVE COURSES FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M. HYG. CANDIDATES

		Credit	Units
INTERDEPARTMENTAL COURSE			
2a,b,c,d	Biostatistics and Epidem.***	1.75	(7)†
4c,d	Research Methods in Community Health	2	(4)
ENVIRONMENTAL HEALTH			
1c	Man's Responses to the Physical Environment **	2.5	
2c,d	Radiation Dosimetry	1.5	(3)
3c,d	Occupational Medical Clinics	.5	(1)
4c,d	Occupational Medical Clinics	.5	(1)
6c,6d	Human Factors in Occupational Performance and Safety	1	
8c,d	Community Air Pollution	1	(2)
BIOSTATISTICS			
2c,d	Statistical Methods	2	(4)
15c,d	Departmental Seminar	1	(2)
DEMOGRAPHY AND HUMAN ECOLOGY			
41c,d	Problems of Population Growth	1	(2)
EPIDEMIOLOGY			
2c,d	Epidemiology of Non-Infectious Disease **	1	(3)
4c,d	Human Heredity	1	(2)
15c,d	Departmental Seminar	1	(2)
INDUSTRIAL HYGIENE			
1c,d	Basic Problems in Occupational Health	3.5	(7)
7c,d	Aerosol Technology	2	(4)
MATERNAL AND CHILD HEALTH			
2c,d	Problems and Programs in Maternal and Child Health	2	(4)
MICROBIOLOGY			
1a,b,c	Ecology and Epidemiology of Infectious Diseases **	2	(6)
11c	Public Health Lab. Proc.	2	
15c,d	Seminar in Microbiology	1	(2)
NUTRITION			
2c,d	Advanced Topics	2	(3)
3c,d	Laboratory Technics	1	(2)
PHYSIOLOGY			
2c	Environmental Physiology	1	
3c,d	Principles of Toxicology	1.25	(2.5)
5c,d	Radiation Biology	1.5	(3)
PUBLIC HEALTH PRACTICE			
2c,d	Public Health Admin. II	2	(4)
4b,c	Control of Chronic Disease	1	(2)
5c,d	Health Education	1	(2)
6c,d	Group Process	1	(2)
9c,d	Admin. Aspects of Community Mental Health Programs	1	(2)
11c,d	Health and Illness in Cross-Cultural Perspective	1	(2)
15c,d	Departmental Seminar	1–2	(2–4)
41c,d	Case Study Analysis of Economic and Administrative Problems in Medical Care	1	(2)
42c,d	Research Methods in Medical Care	1	(2)
TROPICAL PUBLIC HEALTH			
1a,b,c	Ecology and Epidemiology of Infectious Diseases ** (see listing under Microbiology)		
7c	Laboratory Technics	2	

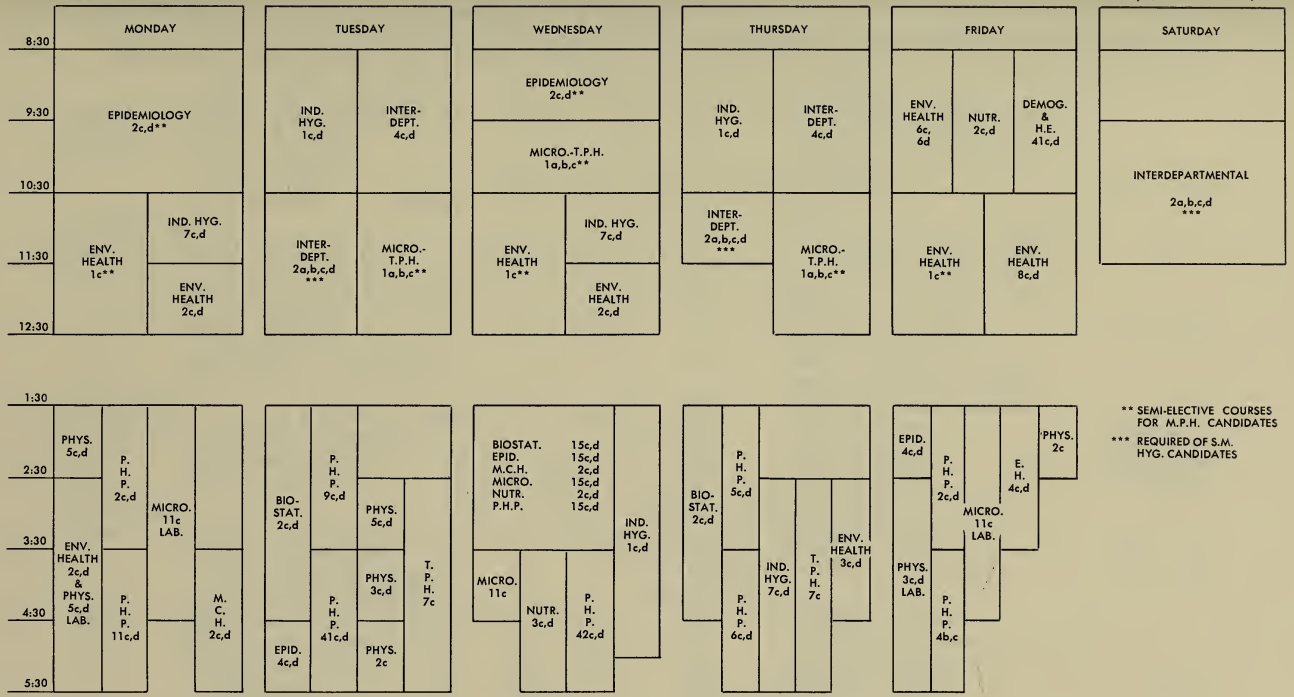
Unscheduled courses: Interdept. Course 42c,d; Env. Health 5c,d; Biostat. 17c,d; Demog. & H.E. 17c,d; Epidem. 17c,d; Ind. Hyg. 8c,d, 17c,d; Mat. and Child Health 17b,c,d; Microb. 12c, 17c,d; Nutrition 17c,d; Physiology 17c,d; P.H.P. 13c,d, 17c,d; T.P.H. 5c,d, 17c,d. (See Department for description)

** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

SPRING TERM — THIRD PERIOD

February 3, 1964 to March 28, 1964



** SEMI-ELECTIVE COURSES FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M. HYG. CANDIDATES

		Credit	Units
INTERDEPARTMENTAL COURSE			
2a,b,c,d	Biostatistics and Epidem.***	1.75	(7)†
4c,d	Research Methods in Community Health	2	(4)
ENVIRONMENTAL HEALTH			
1d	Principles of Water and Food Sanitation *	2.5	
2c,d	Radiation Dosimetry	1.5	(3)
3c,d	Occupational Medical Clinics	.5	(1)
4c,d	Occupational Medical Clinics	.5	(1)
6c,6d	Human Factors in Occupational Performance and Safety	1	
7d	Occupational Medicine	2	
8c,d	Community Air Pollution	1	(2)
BIOSTATISTICS			
2c,d	Statistical Methods	2	(4)
15c,d	Departmental Seminar	1	(2)
DEMOGRAPHY AND HUMAN ECOLOGY			
41c,d	Problems of Population Growth	1	(2)
EPIDEMIOLOGY			
2c,d	Epidemiology of Non-Infectious Disease **	2	(3)
4c,d	Human Heredity	1	(2)
5d	Epidemiologic Problems in Infectious Disease	2	
15c,d	Departmental Seminar	1	(2)
INDUSTRIAL HYGIENE			
1c,d	Basic Problems in Occupational Health	3.5	(7)
7c,d	Aerosol Technology	2	(4)
MATERNAL AND CHILD HEALTH			
2c,d	Problems and Programs in Maternal and Child Health	2	(4)
MICROBIOLOGY			
2d	Current Research	1	
13d	Rickettsial and Viral Diseases	3	
15c,d	Seminar in Microbiology	1	(2)
NUTRITION			
2c,d	Advanced Topics	1	(3)
3c,d	Laboratory Technics	1	(2)
4d	Clinical and Path. Aspects of Nutritional Disease	1	
5d	Nutritional Surveys	1	
PHYSIOLOGY			
3c,d	Principles of Toxicology	1.25	(2.5)
5c,d	Radiation Biology	1.5	(3)
PUBLIC HEALTH PRACTICE			
2c,d	Public Health Admin. II	2	(4)
5c,d	Health Education	1	(2)
6c,d	Group Process	1	(2)
8d	Legal Problems	1	
9c,d	Admin. Aspects of Community Mental Health Programs	1	(2)
11c,d	Health and Illness in Cross-Cultural Perspective	1	(2)
15c,d	Departmental Seminar	1–2	(2–4)
41c,d	Case Study Analysis of Economic and Administrative Problems in Medical Care	1	(2)
42c,d	Research Methods in Medical Care	1	(2)
TROPICAL PUBLIC HEALTH			
3d	Problems in Tropical Health	1	
8d	Introduction to Molluscs	1	
9d	Introduction to Medical Entomology	1	

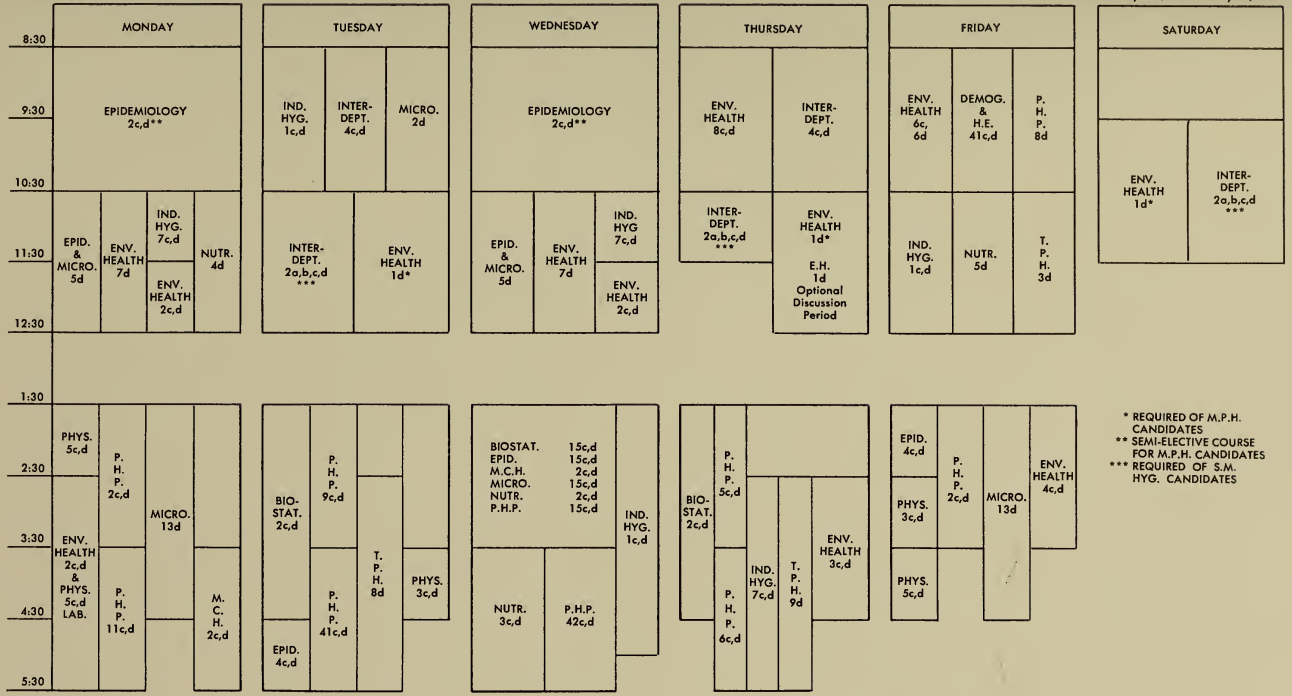
Unscheduled courses: Interdept. Course 42c,d; Env. Health 5c,d; Biostat. 17c,d; Demog. & H.E. 17c,d; Epidem. 17c,d; Ind. Hyg. 8c,d, 17c,d; Mat. and Child Health 3d, 17b,c,d; Microb. 17c,d; Nutrition 17c,d; Physiology 4d, 17c,d; P.H.P. 13c,d, 17c,d; T.P.H. 5c,d, 17c,d. (See Department for description)

* Required of M.P.H. candidates ** Semi-elective courses for M.P.H. candidates *** Required of S.M. in Hyg. candidates

† Figures in parentheses are units for entire course, if this runs longer than one period.

SPRING TERM — FOURTH PERIOD

April 6, 1964 to May 29, 1964



* REQUIRED OF M.P.H. CANDIDATES

** SEMI-ELECTIVE COURSE FOR M.P.H. CANDIDATES

*** REQUIRED OF S.M. HYG. CANDIDATES

CALENDAR FOR THE ACADEMIC YEAR 1963–64

September 9, Monday to September 20, Friday	Orientation Program for Foreign Students
September 16, Monday to September 20, Friday	Registration of Students

Fall Term, September 23, 1963, to February 1, 1964

September 23, Monday	First Period begins
October 12, Saturday	Columbus Day: a holiday
October 14, Monday	Last day for changes in "a" and "a,b" courses of study
November 11, Monday	Veterans' Day: a holiday
November 16, Saturday	First Period ends
November 18, Monday	Second Period begins
November 28, Thursday	Thanksgiving Day: a holiday
December 6, Friday	Last day for changes in "b" courses of study

Recess from Sunday, December 22, 1963, to Sunday, January 5, 1964

January 25, Saturday	Second Period classes end
January 27, Monday to February 1, Saturday	Directed reading period, supervised special studies or field observations

Spring Term, February 3, 1964, to June 11, 1964

February 3, Monday	Third Period classes begin
February 21, Friday	Last day for changes in "c" and "c,d" courses of study
February 22, Saturday	Washington's Birthday: a holiday
March 28, Saturday	Third Period ends

Recess from Sunday, March 29, 1964, to Sunday, April 5, 1964

April 6, Monday	Fourth Period begins
April 24, Friday	Last day for changes in "d" courses of study
May 29, Friday	Fourth Period ends
May 30, Saturday	Memorial Day: a holiday
June 1, Monday	Comprehensive Examination
June 11, Thursday	Commencement

Research Laboratories
665 Huntington Avenue